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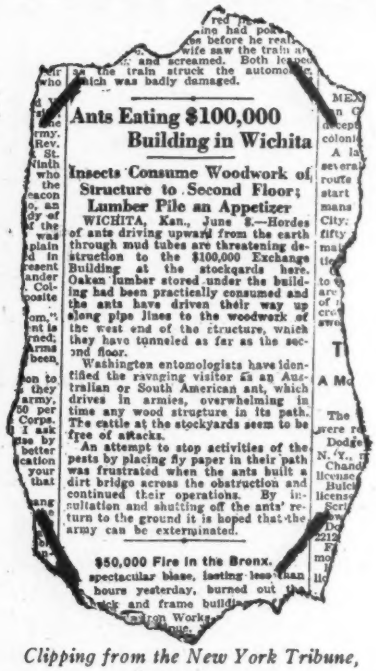

Ants Eating $100,000 Building in Wichita

Insects Consume Woodwork of Structure to Second Floor; Lumber Pile an Appetizer

WICHITA, Kan., June 8.—Hordes of ants driving upward from the earth through mud tubes are threatening destruction to the $100,000 Exchange Building at the stockyards here. Oaken lumber stored under the building had been practically consumed and the ants have driven their way up along pipe lines to the woodwork of the west end of the structure, which they have tunneled as far as the second floor.

Washington entomologists have identified the ravaging visitor as an Australian or South American ant, which drives in armies, overwhelming in time any wood structure in its path. The cattle at the stockyards seem to be free of attacks.

An attempt to stop activities of the pests by placing fly paper in their path was frustrated when the ants built a dirt bridge across the obstruction and continued their operations. By insulation and shutting off the ants' return to the ground it is hoped that the army can be exterminated.

$50,000 Fire in the Bronx.

spectacular blaze, lasting less than hours yesterday, burned out the brick and frame building

Clipping from the New York Tribune, June 9th, 1921

Read this Clipping—

IN many sections of the country white ants (termites) are causing rapid deterioration of structural timber, and this menace is spreading rapidly.

Investigations of these insects made by the U. S. Department of Agriculture are reported in Farmers' Bulletins Nos. 759 and 1037, and among the preventive measures advocated is the following:

"Where stone or concrete foundations are impracticable, timber impregnated with coal-tar creosote should be used. Untreated beams should never be laid on the earth nor imbedded in moist concrete, since they will rot, even if they do not become infested.

"Any wood construction in contact with the ground is especially liable to attack by white ants. Among these may be listed construction timber in bridges, wharves, and similar structures, telephone and telegraph poles, mine props, railroad ties, posts, lumber piled on the ground, wooden boxing for cables, cypress water tanks, etc."

Carbosota Protects Wood from *White Ants* as Well as Decay

TO check the loss occasioned by the white ant pest, preservative treatment should be applied to all lumber and timber used in contact with other wood, or with the ground, masonry, or brick and concrete foundations. The treatment must be thorough, and the method employed must, of necessity, be practicable under conditions common to general construction.

In effectively combating ants and other wood-destroying insects, as well as in checking the ravages of wood decay, Carbosota—particularly when applied by the Open Tank process—is proving a great boon to lumber users all over the country.

Carbosota Liquid Creosote Oil is the ideal wood preservative for non-pressure treatments, i. e., Surface treatments (brushing, spraying and dipping) and the Open Tank process (hot and cold, or hot and cooling bath). It is a standardized, highly refined, liquid grade of pure coal-tar creosote oil, specially processed and uniform the world over.

Barrett

Carbosota

Liquid Creosote Oil

For Preserving Wood

Write for free booklet.

(*Green wood cannot be effectively creosoted by non-pressure processes. It should be seasoned. All framing, drilling of bolt holes, etc., should be done before treatment. If this is impossible, two brush coats of Carbosota should be applied to all untreated surfaces exposed by subsequent cutting or drilling.*)

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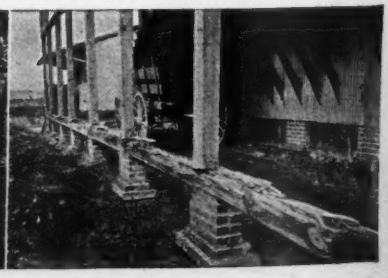
Oak floor honeycomed by white ants (termites). [Reproduced from Farmers' Bulletin 1037, U. S. Department of Agriculture]

Serious deterioration of telegraph pole near ground line due to white ants (termites).



Untreated sills and posts in contact with brick foundation piers entirely destroyed by white ants (termites).

AMERICAN FORESTRY

VOL. 27 AUGUST, 1921 NO. 332

EDITORIAL

PROPOSED TARIFF ON LUMBER

DECLARING that he is opposed to any tariff on lumber Charles Lathrop Pack, President of the American Forestry Association, in a statement to President Harding has pointed out the several reasons why he believes that Congress should not impose such a traiff.

Mr. Pack believes that with the country in vital need of at least a million homes and quite as many, if not more, farm buildings, any tariff which would add to the cost of construction would result in serious delay in solving the housing problem and the equally important need of buildings for agricultural purposes. He believes that now is the time to build because it is certain that prices of lumber will increase as the years go by to such an extent that unless adequate housing is now provided it will be seriously retarded by growing costs.

He also believes that any tariff which will add to the cost of paper is inadvisable because it will materially affect the production of newspapers, magazines, and books, the greatest educational mediums in the country.

Another reason advanced in opposition to the tariff by Mr. Pack is his belief that no restrictions should be made against the use of the natural resources of any country by the United States when such natural resources of its own are being steadily decreased by our constant use of them.

Finally he declares that our own forests are being depleted at such a rate that it will be false economy to adopt any measure which would increase the demands upon them when such demands can be supplied by importation from other countries. The time is now here, he says, when we have awakened to a realization of the serious situation brought about by our diminishing forest areas and our failure to provide means for perpetuating our forests so that they will provide for our present as well as our future needs.

WHAT DOES THE PUBLIC WANT?

THERE are now before Congress two so-called National Forestry Bills; the Snell-McCormick Bill, which has been frequently discussed in AMERICAN FORESTRY Magazine, and the bill recently introduced by Senator Capper. In the main the objects which these bills purpose to accomplish is the same—the prevention of forest devastation by fire, and the creation of an effective basis for reforestation throughout the country. The difference lies purely in the means suggested, the Capper Bill proposing to place forest control chiefly and directly in the hands of the Federal Government, while the Snell-McCormick Bill urges upon the several states their plain duty and provides machinery for Federal example and cooperation in a manner similar to the operation of the Federal good roads laws. Foresters disagree in the same way that railway economists have for years disagreed upon matters of railway ownership and control. Federal control versus State Rights and interests has formed the basis of a thousand such controversies since the first inception of our democracy, and will continue to do so.

It is not for a group or society of the scope of the American Forestry Association to deprecate any method of accomplishing the desired end, nor to put forward another plan as being without flaw. Through our members in every part of the United States we are interested solely in achieving a practical and economic forest policy. That there are other ideas and plans for accomplishment of that end serves only to emphasize the fundamental issue, and a thorough discussion of the problem will best satisfy the paramount interest of the public. What the public wants is not just a Snell-McCormick Bill or a Capper Bill, but an honest forward-looking forest policy. The American Forestry Association strives to represent that public interest, and believes that it is doing so in endorsing and advocating the Snell-McCormick Bill because it is the bill endorsed and desired by the United States Forest Service, whose function it is to know what is best for the forestry interests of the country.

FORESTRY FOR CHILDREN

WOMEN of Tennessee, aroused by the agitation in behalf of forestry, both relating to the states and nationally, have accomplished what is not only an innovation in forestry legislation, but an achievement which will make every citizen of the next and succeeding generations, a forest conservationist.

This is nothing less than an "act to require and promote the study of forestry and kindred subjects in the

public schools of the state."

As Tennessee has fine forests and a great variety of trees the women decided these should be conserved for present and future generations, and that the best way to secure this conservation was to give the children a knowledge of forest and plant life. This they believe will promote a higher appreciation of tree life, its contribution to the soil, its beauty and artistic value, all of which they declared should be a matter of enforced education and taught in the schools of the State.

The act requires that "the curriculum of every public school in the State shall include a study of forestry and plant life, which study shall include the names and varieties of trees grown in the State, their age of maturity, their value to the soil, to animals and birds." Also the children are "to be given an object lesson in the study of forestry" by "visits to some forest and there instructed."

Every pupil must, during the school session write at least one short essay or story on forestry.

The promoters of this act indicate that correlation of the study of forestry in connection with other studies in the public schools is explained as follows: An art lesson may be taught in the drawing of trees and plants. A composition lesson may be taught in writing of trees and plants. A language and memory lesson may be taught in knowledge gained by the observation and the reading of books on trees and plants so that the child may grow up with the knowledge of the value of forestry.

In other words it seems these children are to be taught the alphabet of forestry so that when they grow up they can talk the language of forestry.

INDIANA'S NEW FOREST LAW

THE latest statistics credit Indiana with less than 7 per cent of timber land. The new forestry law proposes to encourage land owners to preserve the few woods remaining by assessing them at $1.00 per acre. This law does not subsidize forestry, because the income from a forest investment in Indiana would not justify a valuation of more than $1 per acre, according to State Forester Charles C. Deam.

Under this law "forest plantations" and "native forests" may be classified as forest land and be assessed at $1 per acre. The law definitely defines the number of trees a forest plantation and native forest must have to be classified.

Land to be classified must be surveyed and appraised. The cost of the survey is paid by the owner, and the appraisement by the county. The land is appraised at its true cash value, exclusive of all timber on it.

Any sized area not less than three acres may be classified. No land shall be classified that has a dwelling or other buildings on it. No grazing of any kind or amount is permitted. The State Forester may visit classified land as often as he deems necessary, and make, in writing, such recommendations to the owner as he sees fit. The owner is compelled to make an annual report to the State Forester of such a character as he may direct. The owner can withdraw his land from classification at any time by making application to the State Forester. When application is made the owner must have the assessor appraise the land, exclusive of the timber on it, in the same manner as when entered. The first and second assessments are then compared and if the land has increased in value, the owner pays as an unearned increment tax the difference between the two assessments, which is divided among the township, county and State.

The law permits the classification of land anywhere, even if bordering a city. The timber is not taxed in any way, even when it is cut. The owner has absolute control of the cutting. He can cut any time or any amount, but when a vacancy is made in the forest it must be replanted at the first planting season.

NEWS PRINT FROM SPRUCE PINE

A NEW use for an unused wood is almost equivalent to creating a new forest, since it increases the available supply and reduces the consumption of other woods of established value. This is one of the reasons at least why so much interest has been shown in the possible utilization of southern pine for paper making, particularly newsprint, and in the printing of a recent issue of the *Birmingham Age-Herald* on paper made from "Alabama spruce pine," an interesting experiment has been brought to a head and broad possibilities developed.

For many years the wood from several species of southern pine have found use in paper making, but thus far its utilization has been confined to unbleached stocks and coarser grades, among which kraft and box boards predominated. With the temporary and exaggerated shortage of northern pulp wood, primarily spruce and balsam, which are the main eastern sources of groundwood and sulphite pulp for newsprint, renewed attention was given to the perfection of processes which would bring the great potential supply of southern pulp woods into line for commercial utilization. The successful bleaching of sulphate pulp was accomplished in laboratory experiments some time ago, both government and outside investigators having reported a fair measure of success. The direct application of these results to commercial practice has not been announced, and naturally capital for paper production will not seek investment in the South outside of the established fields until the practicability of the processes is thoroughly established.

The spruce pine from which the *Age-Herald* was printed was shipped to Niagara Falls and converted into newsprint by a company and on machines which use Canada spruce. The product, according to the statement made in the *Age-Herald* in their issue of June 20, was made from 70% ground wood pulp and 30% sulphite pulp. In appearance the paper has a slightly more

yellow tinge than spruce newsprint, but otherwise seems to be equal to that used by many large metropolitan dailies.

Information is still lacking as to the exact species referred to as "spruce pine," and this confusion as to botanical identification prevents drawing conclusions as to the field which is actually opened up by this experiment. It is stated that spruce pine "has no practical use, and has been going to waste as a valueless product until the *Age-Herald* demonstrated its use for the manufacture of newsprint paper. It never gets larger than eight or ten inches in diameter." It is reported further that "these trees grow plentifully on high rocky soils in the Warrior River section and throughout the northwestern part of Alabama." There are some half dozen trees which in the confusion of popular names are called spruce pine, but this particular species is probably either *Pinus glabra* or *Pinus Virginia*. If the former, its range and, therefore, the supply, is distinctly limited; if it is *Pinus Virginia* or scrub pine, which is called spruce pine in parts of the South, the supply is much greater.

Whatever the exact species it seems logical that if one pine of a pitchy nature can be made into newsprint the same process with modifications could be applied to any or all of the southern pines, thereby creating an enormous supply of pulpwood, which in the small trees has limited value for other purposes, and with the further great promise that if loblolly pine (*Pinus taeda*) can be included in the list it offers greater possibilities for rapid and profitable reforestation than other species in the eastern United States.

Future developments along this line will be awaited with interest. If it is found feasible to establish paper mills near this source of supply the practical utilization of pine for newsprint would seem assured. On the other hand, if the process is not perfected, continued operation of paper machines with resinous wood too expensive, or a satisfactory quality cannot be maintained, the laboratories will have to continue their investigations until a sound commercial basis is established. In any event, there is not likely to be any radical shift of pulpwood from the North to the South, but rather a supplementing of the northern resources and ultimate promise of continuous production from the fast-growing loblolly pine.

CALIFORNIA'S FORESTRY WORK

THE California Legislature of 1921 did more to advance the cause of forestry in California than could have been exppected in view of the popular demand for economy in state expenditures, and the movement for reorganization of the state goverment. The latter was the cause of a hard fight to hold the state board of forestry just as it was but succeeded and there is no change. The board stands as provided in 1919 with one member representing the timber industry, one of the livestock industry, one the grain and hay industry and one at large, "which shall supervise and direct all matters of state forest policy, management and protection." Just as important as that is the fact that the personnel of the board is unchanged, former Governor George C. Pardee being the chairman. That leaves everything in the very best shape for progress.

A concurrent resolution providing for a survey of land that can be afforested or reforested, with an appropriation of $10,000 will lead to good results, as it will lay the foundation upon which to ask for a good appropriation in 1923 for the purchase by the state of such lands, thus starting the work of providing perpetual forests. This will show owners of such lands what can be done and without any doubt many of them will begin the management of their forests in such a way as to perpetuate them. With the state and the federal Government showing the way and co-operating with timber owners there should soon be practical and successful continuous yield management under way in California.

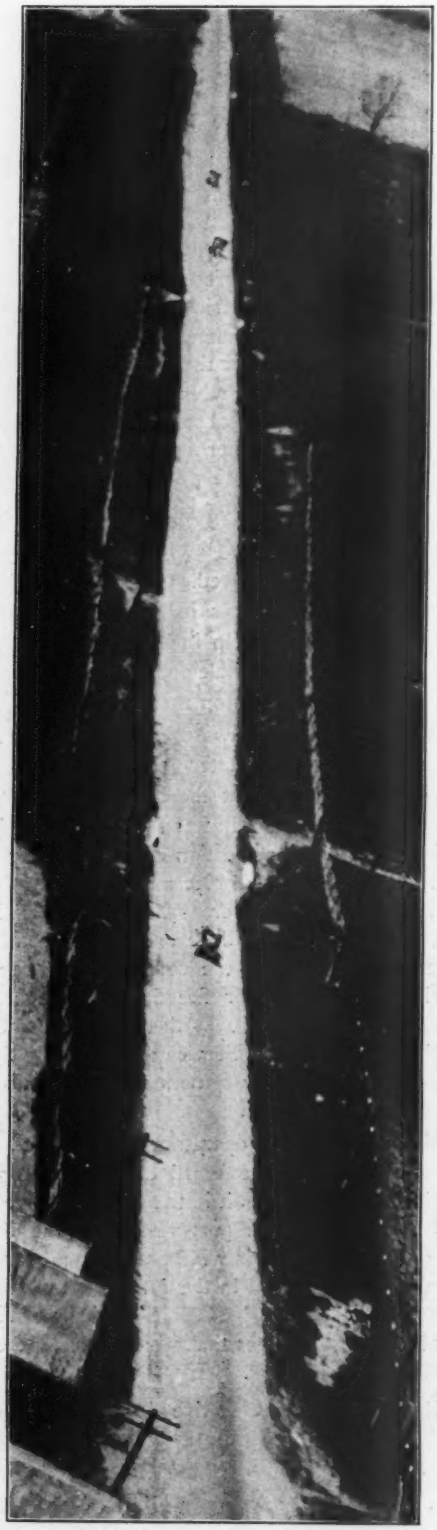
The salaries of the state forester and his deputies were increased and $35,000 was appropriated for a state forestry nursery. Also $300,000 ws appropriated for the State Redwood Park in Humboldt and Mendocino counties, and this means that at least that much more will be expended for the same purpose, insuring a fine area of great redwoods to be preserved. A bill providing for instruction in the public schools in fire prevention and suppression will be a great help in keeping the importance of this work before the people and haveing the young folks grow up with right ideas on the subjects.

The changes in the game laws are important because they make the open seasons later in the year in most of the timber counties, so that the hunters will not be turned loose in the woods until after the first rains. The appropriation for forest protection to be used by the state board of forestry is $75,000, an increase of $50,000 over 1919; also there were special appropriations of $50,000, most of which will be used in the southern part of the state. Many of the counties have already made provision for funds for fire fighting which will bring the total up to $300,000. With the funds available for the United States Forest Service and with fire fighting measures inaugurated by owners of timberlands the state should be well protected.

Practically all the timber operators have entered into an agreement with the state board of forestry to dispose of their slash, each to do it in the most effective and economical way and then report results to the board at the close of the year. This will be used as a basis for such rules as may be needed in the future, the operators all agreeing that the time has come to dispose of all slash in order to prevent fires that would destroy the incoming timber after cutting.

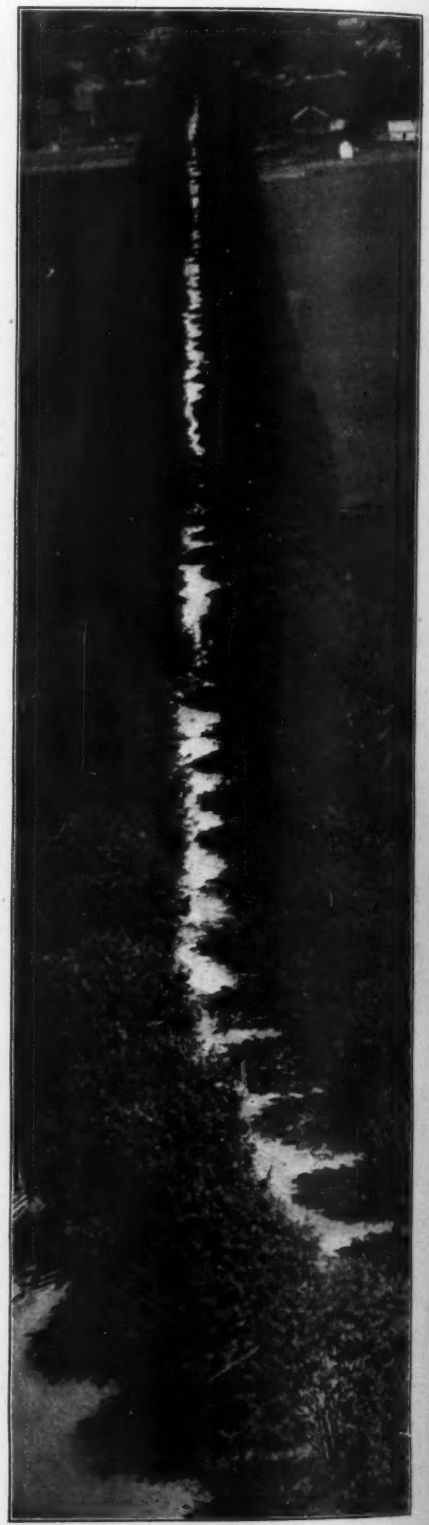
The California Forest Protective Association, a wide awake and progressive organization, has been of great assistance in developing the forestry interests of the state and predicts increased attention to forestry measures by timberland owners by the general public in the future.

A LOOK INTO THE FUTURE



WHAT Roads of Remembrance may become is well shown in these pictures taken from an airplane by the Baltimore Evening Sun, which has joined the American Forestry Association's campaign for memorial tree planting along the highways of the country. The road on the right reminds one of the well shaded roads of France, those roads which the doughboy knew so well and which are famous throughout the world. The road on the left is the average American road.

The Roads of Remembrance suggestion of the Association has taken hold everywhere. The Chicago Tribune in the central west is carrying on a daily campaign for roadside tree planting. One of the last official acts of Col. F. W. Galbraith, Jr., Commander of the American Legion, was the planting of a memorial tree at Vandalia, Ohio, where the National and the Dixie Highways cross. Shortly before he was killed in an auto accident Col. Galbraith issued a call to the state departments of the Legion to push memorial tree planting. The Association suggests that a mile of the Dixie and the National highway each side of Vandalia be dedicated in his honor to commemorate the work he began so well.



[Photographs Copyrighted and Republished by the Courtesy of the Baltimore Evening Sun.]

THE HARD PINES OF THE NORTHEAST

BY JOSEPH S. ILLICK

THE pines are the best-known timber trees of the United States. To determine why they are so well known is not difficult. They are among our commonest forest trees, and have come in contact with the average man in so many different ways that the word "pine" is really a common household word.

Ever since the early pioneers arrived pine wood has held a prominent place in every walk of life. It would be difficult to name a single line of development in which it has not taken part. Much of our national prosperity and personal comfort may be traced back to the glorious pine trees that originally covered extensive areas of land in all parts of our country.

RED PINE GROWING IN THE OPEN

The needles occur in tufts or clusters at the branches.

There is another reason why "pine" is a real household word. It is because the pine trees are so common. They occur in every part of the country and grow upon a wide range of situations. They are at their best in temperate regions, where they can be found from sea level to the timberline,—an altitudinal range of about 11,500 feet. Some of them venture into the sub-tropics, and a few brave the cold of the far North, where they have pushed forward to places within the Arctic Circle; and in this wide range they occur on all conditions of soil from deep swamps to dry and rocky mountain tops.

And there is a third reason why the pines as a group are so well known. Few people know that there are seventy different kinds of them in the world, and that thirty-five are native to North America. This means that there are as many different kinds of pine trees native to North America as occur in the rest of the world. Only a few other groups of trees have so many representatives of economic importance. It may be helpful to tell what is meant by the term "hard pines." In the early days, names could not be coined for the different pines as rapidly as the trees were discovered, so a practical grouping of them took place. Two groups were made, namely, *soft pines* and *hard pines*. The soft pines include all the species which produce soft wood; while the hard pines embrace those species which produce relatively hard wood.

A THRIFTY PLANTATION OF YOUNG JACK PINE

This is on the Jacob Nolde estate near Reading, Pennsylvania

PLANTATION OF (1) JACK P.NE AND (2) RED PINE
All the trees were planted at the same time, but the Jack Pine is almost twice as high as the Red Pine.

In the United States there are twelve species of soft pine and twenty-three of hard pine. The white pine is the only Eastern species belonging to the soft pine group. It has a number of other common names, among them being "pumpkin pine," "cork pine," and "soft pine."

A THRIFTY PURE STAND OF YOUNG PITCH PINE
The most typical hard pine of the Northeast has more common varieties than any other pine in that section.

Western white pine and sugar pine are the two most important Western species belonging to the soft pine group.

Twelve of the twenty-three hard pines native to the United States occur in the Eastern and Southern States. Some of them have a dozen or more common names. It would not be possible to describe the twelve species in a single article; hence, five species of hard pine occurring in the northeastern part of the United States have been selected for special consideration in this article. Other species will be described in later numbers of "American Forestry."

The five pines considered in this article are:

(1) Northern jack pine; also called Bank's pine. (2) Red pine. (3) Pitch pine. (4) Jersey or Scrub pine. (5) Table mountain pine.

TYPICAL OPEN-GROWN PITCH PINE
It can be regenerated naturally with success and is here surrounded by a dense stand of its young offspring.

The last two species are not strictly pines of the northeast, but they extend northward as far as northern Pennsylvania, and occur along the Allegheny Mountains in mixture with trees typical to the forest flora of the northeast.

PITCH PINE MIXED WITH HARDWOODS
It usually occurs so, but stands over its companions because of its fire-resistance.

THE HARD PINES OF THE NORTHEAST MAY BE DISTINGUISHED BY THEIR NEEDLES

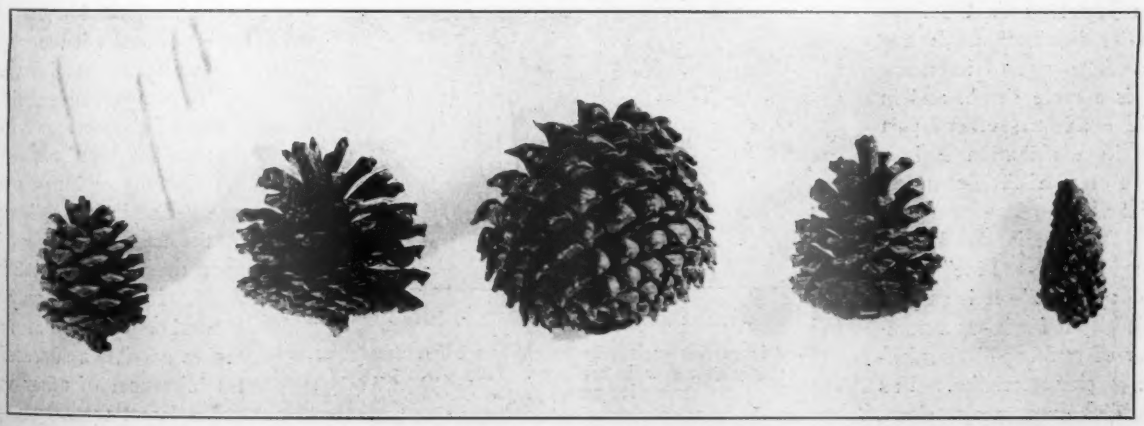
They are here shown in the following order: Red pine, Pitch pine, Table Mountain pine, Jersey or Scrub pine and Jack pine.

NEEDLE KEY*

1. Needles in clusters of three.....Pitch Pine
1. Needles in clusters of two..... 2
2. Needles 5 to 6 inches long.....Red Pine
2. Needles less than 4 inches long..... 3
3. Needles less than 1½ inches long.....Northern Jack Pine
3. Needles more than 1½ inches long..... 4
4. Needles straight, stiff, sharp-pointed, 3 to 4 inches long.....Table Mountain Pine
4. Needles twisted, flexible, dull-pointed, 1½ to 3½ inches long.....Jersey or Scrub Pine

CONE KEY*

1. Cone-scales not armed with prickles or spines.....Red Pine
1. Cone-scales armed with prickles or spines 2
2. Cone-scales armed with stout pines....Table Mountain Pine
2. Cone-scales armed with slender prickle 3
3. Cones 1 to 2 inches long, conic-oblong, usually curved and pointing forward Northern Jack Pine
3. Cones 2 to 3½ inches long, sharply conical to ovate, not curved; point outward 4
4. Cones 2 to 3 inches long, narrowly and sharply conical when closed, ovate when open.....Jersey or Scrub Pine
4. Cones 2 to 3½ inches long, ovate and more or less spherical when open..... Pitch Pine



THE HARD PINES OF THE NORTHEAST MAY ALSO BE DISTINGUISHED BY THEIR CONES

They are here shown in the following order: Red pine, Pitch pine, Table Mountain pine, Jersey or Scrub pine and Jack pine.

The above keys are simple. Each key is made up of 4 pairs of paragraphs giving distinguishing characteristics. Each pair of paragraphs consists of two alternate statements. The one is followed by the name of a tree and the other by a number. If the name of a tree follows, then it is the tree in question; if a number follows then it directs you to a pair of paragraphs further on in the key preceded by that number. If the characteristics of the tree to be identified do not fit in the first paragraph, then they will correspond to those given in the second paragraph, or else the tree in question does not belong to the group considered in the key.

Many interesting things may be said about these five pine trees, but before an attempt will be made to describe some of their interesting habits we want to find out if we really know these trees. In order that we may be positive about our acquaintance with them these two simple keys have been prepared. They will enable anyone to identify these five pines with certainty. The one key is based upon leaf characteristics, and the other upon cone features.

The jack pine extends farther north than any other American species of pine. It reaches within one and one-half degrees of the Arctic Circle and extends southward to the southern shores of Lake Michigan. Its north and south range is about 1,600 miles, and its east and west distribution covers about 2,500 miles.

Jack pine is almost a trans-continental species, extending from Nova Scotia northwestward to the southeast corner of the Yukon region. It is distinctly a tree of the north woods, that is, a Canadian tree, reaching its best development in northern Ontario and Quebec, and in Manitoba, Saskatchewan and Alberta. Some of the finest stands occur west of Lake Winnipeg.

The jack pine is rather scrubby towards the limit of its distribution. In the northern part of its range it is a mere shrub, and in the extreme southern part of its distribution it is a small tree of little commercial value.

Jack pine is also known as "Bank's Pine" and "Gray Pine." It is easy to identify it for it has a number of striking distinguishing characteristics. Its needles are very short, usually less than one and one-half inches long. They occur in bundles of two and are often somewhat clustered at the end of the twigs. No other pine native to eastern North America has such short needles. Just why this tree has such short needles is a debatable question. It may be the result of evolution, or we may speak of it as special adaptation to the environment in which the tree lives. Throughout the entire region in which this tree is native the snowfall is heavy. If the tree produced long needles, it is quite probable that large quantities of snow would be held upon the tree, and as a consequence enormous pressure would be developed upon the branches, with the result that many tree crowns would be completely crushed. The development of short and smooth needles prevents the accumulation of large quantities of snow on the leaves, and thus prevents possible great damage by snow pressure.

The cones are equally as distinctive as the needles. Unlike those of most other pines they occur near the end of the season's growth. They are from one and one-half inches to two inches long, bear no stem, are lop-sided in form, and pointed at the apex and conical in outline. As a rule, they are held in an erect position upon the branches and may remain closed for many years. One of the most distinctive features of the cone is the fact that they are more or less curved, that is, lop-sided, and persist for many years after they reach maturity.

A CLUSTER OF NINETEEN PITCH PINE CONES

Such a large cluster is very rare. The cones usually occur singly or a few in a cluster. They often persist for many years.

We have been taught that the jack pine is an inferior tree. The name "Jack" at once conveys an impression of inferiority. While it is not one of the most important commercial timber trees of the northeast, yet it has many merits, and the longer and better we know it the more will we appreciate it. One of its commendable habits is that of pioneering. After an area has been lumbered over heavily or burnt over repeatedly, jack pine is one of the first trees to go in upon the area and establish itself. It leads the way to natural re-forestation and makes possible a successful establishment of other valuable forest trees.

Jack pine has other good points. Among its merits are rapid growth when young, and its adaptability to poor sandy soil. When young the tree grows far more rapidly than most of the eastern evergreen trees. The growth of a season is not laid on in one continuous operation, but is usually laid on in installments. The trees grow for a while, then rest and later grow again. All this takes place in the same season. The total growth of a season is considerably greater than that of many other trees. In a mixed plantation of white pine, red

pine, jack pine, the jack pine trees were twice as high as the red pine and three times as high as the white pine at the age of eight years.

While the tree does not attain an exceptionally large size or produce unusually fine lumber, yet it has good possibilities of profitable utilization for pulp wood, box board, mine timbers, and other low-grade material. A pulp mill located in Pennsylvania, having a capacity of 150 cords per day, uses jack pine from Canada almost exclusively.

BARK OF THE RED PINE

More than 1,000,000 jack pine trees have been raised in nurseries operated by the Pennsylvania Department of Forestry. All of them have been planted upon privately-owned or State-owned forest land within the State. Among the oldest plantations of jack pine in Pennsylvania is a large one located on the Jacob Nolde Estate, a few miles south of Reading. The trees are growing rapidly and good financial results are promised by the entire plantation.

While the jack pine is only an ordinary tree it deserves a place in our forests, and if planted upon proper sites and handled carefully, will produce much wood which we need and can use. Let us not forget that it is with trees somewhat as it is with man. Most of the work in the world is done by ordinary men, so most of the wood will be produced by ordinary trees.

BARK OF THE SCRUB PINE

The red pine is a valuable timber tree. It has a number of common names, probably the commonest one being "Norway Pine," a name wholly out of place because it is not a foreign tree, but a native of our northwoods. It is said that the name "Norway Pine" was given to this tree by a Spanish sea captain, who thought that he saw some resemblance in it to the pine trees he had seen in Norway. This supposed resemblance caused him to suggest the inappropriate name of "Norway Pine," which has persisted until today and will, no doubt, continue for a long time to come.

BARK OF THE PITCH PINE

The next commonest name is "Red Pine." This is an appropriate name, for the bark of the tree is of a reddish hue, and the heart wood is usually pale reddish in color.

This tree is equally as unfortunate as the jack pine in having an inappropriate scientific name—*Pinus resinosa*—meaning *resin pine*. Why it was given this name is indeed strange, for its wood contains less resin than any other pine. "Red Pine" is the name by which this tree should be known. The wood of red pine is of a superior quality and used for most purposes for which white pine is used. The similarity of the wood to that of white pine is responsible for another false common name, namely, "White Pine." Some dealers mix red pine wood with that of white pine, and palm off all of the material as white pine, and the consumer, as a rule, does not know the difference. Red pine is easy to identify. It is a tree of the northwoods, extending as far south as northern Pennsylvania and the Lake States, and being at its optimum in the northern part of the Lake States and the southern provinces of Canada. It may reach a height of 70 or 80 feet, and a diameter of three feet.

Probably the most distinctive parts of the tree are its needles and cones. The needles are slender, flexible and from four to six inches long, and occur in clusters of two, being surrounded at the base by a thin membranous coating or paper-like wrapper. If one views the tree from a distance the needles occur in tufts or clusters at the end of the branches. This characteristic is very helpful in distinguishing the tree from a distance.

The cones are about two inches long. They occur at the end of the season's growth and their scales are *not armed* with any spines or prickles. It is the only pine tree native to eastern North America whose cone-scales are unarmed. In addition to the leaf and cone characteristics which should enable one to identify the tree at any season of the year, its general form and appearance, as well as its distinctive bark, will help to identify it. It is one of the most attractive coniferous trees of the northeast, and its bark is reddish in color and marked with shallow fissures.

A PROMISING PLANTATION OF SCOTCH PINE

Scotch Pine will grow satisfactorily upon almost any soil, except hard clay, swampy or peaty soils, and it has been planted extensively through the Eastern United States.

Special efforts should be put forth in protecting forest land upon which red pine occurs, and where it is absent it may be planted. During the past ten years more than 1,000,000 red pine seedlings were planted on the State Forests of Pennsylvania about 700,000 seedlings and transplants have been supplied by the Pennsylvania Department of Forestry to private planters throughout the State. This does not include all the red pine trees planted within the State, for additional trees procured from commercial nurseries were planted on privately-owned forest land. It seems fair to estimate that at least 2,000,000 red pine trees have been planted in Pennsylvania, and most of them are making a satisfactory growth.

Red pine is one of the most important timber trees of the northeast, and as time goes on its real merits will become better known. This valuable and promising forest tree should be carefully protected and managed, and its range extended by planting seedlings or transplants on our devastated mountain slopes. They will grow rapidly and produce considerable quantities of high-grade wood which we need and can use for essential purposes.

Pitch pine is probably the most typical hard pine of the northeast. It is truly a hard pine, and occurs generally throughout the northeastern part of the United States. It may be said that the Canadian boundary line is its northern limit, for it occurs only in a few places in Canada. It reaches its best development in Pennsylvania, and extends southward along the Allegheny Mountains to North Carolina and Georgia.

Pitch pine possesses more common names than any other pine in the northeast. It has at least a dozen. Here are some of the common names by which it is known: Pitch pine, jack pine, black pine, nigger pine, torch pine, yellow pine, hard pine, scrub pine, bull pine, long-leaved pine, rich pine, and fat pine.

Most of the common names refer to some distinctive feature of the tree or to its wood. The names "black pine" and "nigger pine" refer to the dark bark which is found upon young and middle-aged trees and upon fire-scarred trunks. This tree is the most fire-resistant pine in the East. Forest fires will naturally kill small seedlings, but as soon as the trees reach sapling-size they develop a heavy bark which makes them extremely resistant to fire. Forest fires have burned over extensive forest areas, apparently killing every living thing found thereon, but upon examining the area a year or so after the fire, one is amazed to find that many of the medium-sized and larger pitch pine trees have entirely withstood the heat of the fire and are still thrifty.

The name "torch pine" was given to this tree because it supplied the earlier settlers with pine knots which were used extensively as torches about homesteads and for traveling at night. The name "yellow pine" refers to old and mature specimens which have lost their typical blackish

TABLE MOUNTAIN PINE

This is growing on rocky cliffs along the Susquehanna River in Pennsylvania.

bark, and subsequently developed a yellowish bark. The names "rich pine" and "fat pine" are local. They were given to this tree because many old specimens are often *rich in fat*, which is a local way of saying that the tree is resinous. The name "long-leaved pine" is quite appropriate, when one is considering only the pines of the northeast, for some specimens of pitch pine develop needles which are much longer than any other pine in the northeast. It is not unusual to find trees bearing needles which are six or more inches long.

No hard pine native to eastern North America is easier to identify than the pitch pine, for it has a few positive distinguishing characteristics. Its needles occur in bundles of three and are from three to five inches long. All other hard pines of the northeast have their needles in bundles of two, and they vary considerably in length and texture from those of the pitch pine.

The bark of pitch pine is scraggy in appearance, and broken up by irregular fissures. Early in the life of a tree the bark becomes quite thick and consequently after they have reached the sapling age the trees are very fire-resistant. In young and middle-aged trees the bark is very dark to blackish in color, while in old and mature specimens it may become yellowish. The trunk may be covered with gnarled branches, and occasionally with dense mats of leaves. It is the only pine which produces these dense formations of leaves along the main stem so that they appear like unbroken mats, often completely enveloping the trunk.

The cones are from two to three and one-half inches long and more or less ovate to spherical when opened. They persist for many years. Many individual trees may be found loaded down with thousands of cones which have persisted for many years. In case of heavy snowfall, these cones make an excellent place upon which the snow may rest, and consequently it often accumulates in such enormous quantities that often many branches are broken off and sometimes entire crowns are completely crushed.

From a commercial point of view the pitch pine is not so important as the white pine, but it is gradually gaining favor, for new and better uses are being found for its wood continuously. In the early days when white pine lumber was plentiful, the pitch pine was despised. No one cared to handle such an inferior wood. But market

A FINE SPECIMEN OF TABLE MOUNTAIN PINE

Probably the largest specimen in the world. It grew on Pine Mountain, Mont Alto State Forest in Pennsylvania.

and forest conditions have changed. White pine is now very scarce, and unusually high in price. The best timber has been removed from our forests, and consequently we are beginning to be satisfied with ordinary wood. Pitch pine is an ordinary wood, but it has already won a place on our market, and as time goes on it will move forward into even a better position. It is also fair to assume that its wood will improve in quality when the trees from which it is derived are raised under good forest management.

In addition to being fire-resistant and producing a fair grade of wood, pitch pine has other merits. It grows naturally in close association with rock oak and chestnut, and consequently it is one of the trees that will help fill up the vacancies made by the chestnut, which is disappearing rapidly from our forests because of the destructive work of the chestnut blight.

YOUNG PITCH PINE

Showing clearly the erect, very attractive candle-like new growth by the installment method.

It is important that we should not condemn the pitch pine or any other ordinary tree without studying their silvical habits fully. Until a few years ago pitch pine was regarded as a slow grower, and because of this belief is called "jack pine." The writer made a special study of the growth of pitch pine and found that it grows faster than is first apparent, for instead of placing its growth of a season at one time, it lays it on in a number of installments. This installment method of growth caused many observers to conclude that the tree grew slowly, for they thought that each installment represented a year's growth, while, in fact, each year's growth embraced from two to three installments, and the real total growth of a season was considerably greater than the apparent total growth.

Scotch pine is known to the foresters of the world as a fast-grower in youth. No attempt will be made to disprove this statement, but it is only fair to the pitch pine to state that in a mixed plantation of Scotch pine and pitch pine, located in Central Pennsylvania and averaging 15 feet in height, the pitch pine are keeping their tips abreast with those of the Scotch pine.

Among the pine trees that possess unfortunate common names is the "scrub pine." The word "scrub" implies that the tree is undesirable as a forest tree and produces inferior wood. The wood which it produces is inferior to that of the white pine and other important pines, but this does not imply that the wood is not of a satisfactory quality for use in our wood-using industries. In fact, the wood of this tree is being used more extensively each year for pulp, shipping crates, and general construction work. A few years ago more than 20,000 board feet of scrub pine were cut in a woodlot in north-central Pennsylvania and used in the construction of one of the most up-to-date barns in the Keystone State.

This tree is also called "Jersey Pine," because it was reported as abundant in parts of New Jersey, where pine forests occur over extensive areas known as the "pine barrens." Recent investigations, however, have shown that most of the trees in the pine barrens are pitch pine and not Jersey or scrub pine. Another name applied to it locally is "slate pine." This name was given to it because it occurs locally on slatey shale soil.

In several respects the scrub pine resembles the jack pine, but the two trees can readily be distinguished from each other. In order to prevent confusion between them the one is sometimes called northern jack pine and the other southern jack pine. Fortunately, the two trees do not meet in their natural distribution. Jack pine is a tree of the north woods, and scrub pine is a tree of the sunny southlands.

The occurrence of the scrub pine may also help to identify it. It is neither a tree of the coastal plains nor of the high mountain lands, but prefers the rolling uplands between these two extreme positions, and is common and seems to thrive upon rather dry and sandy soil.

Scrub pine has many striking distinguishing characteristics, by means of which it may be recognized. Its needles occur in pairs. They are twisted, spread widely from each other and are from two to three inches long. No other pine tree has needles which are so twisted and spread so widely. If one takes a position under a tree and looks up into its crown, the light seems to be uniformly screened by the evenly distributed leaves. This type of leaf distribution is entirely different from some other pines, particularly the red and pitch, which have their needles clustered or tufted at the end of branches.

The branchlets also have distinctive features. They are smooth, purplish, tough, and usually wavy—not stiff and straight as those of the other pines. The bark on the trunk is smoother and redder in color than that of any other native pine. The cones are narrow and conical, rather sharp-pointed, and persist for several years.

Scrub pine may be regarded as a pioneer tree, for it is one of the first trees to march out from its forest habitat and reforest abandoned fields. There are thousands of acres of farm land throughout its range which were abandoned and have since been completely occupied by it. The resultant trees cannot be placed in a class with the forest giants, or sylvan monarchs, but they reach an average size and will produce lumber which can be used to advantage for ordinary purposes.

One of the least known of the hard pines of the East is the table mountain pine. For a long while it was thought that this tree occurred only upon the high table lands of the southern Allegheny Mountains in North Carolina, Tennessee and the Virginias. But about the time of the Civil War a few specimens were discovered in Pennsylvania. Now it is known to occur in many places within the State, extending as far north as Clinton county and northeast to Berks and Schuylkill counties, these points being the northern limit of the trees' entire range.

A TWO STORIED FOREST OF SCOTCH PINE IN EUROPE

One of the major forest trees of continental Europe. This is what may be expected if it is planted and properly cared for.

This tree is also called "Poverty Pine" because it grows and usually thrives on poor, rocky and shallow mountain soil. It is an aggressive tree, and consequently becomes a good competitor with other trees upon poor and exposed situations; but it makes its best growth when standing in mixture with hardwoods upon rather fertile soil.

What is probably the largest known table mountain pine tree in the world grew up on a mountain side near Mont Alto, Franklin County, Pennsylvania. This specimen is 73 feet high, 23 inches in diameter at breast-high, and free from branches for a distance of 40 feet above the ground. It stood among a mixed stand of chestnut, oak, and other hardwood trees.

While this tree is typical of our highland forests, it is found locally at low elevations. The writer recalls finding the tree growing upon an island in the Susquehanna River only about 200 feet above sea level, and its roots washed almost continuously by the flowing water. Numerous specimens occur upon the islands of the Susquehanna River and the adjoining river hills of York and Lancaster counties in Pennsylvania.

Few trees are easier to identify than the table mountain pine. Its needles, which are present at all seasons of the year, occur in pairs, are very stout, stiff and extremely sharp-pointed. No other pine native to eastern North America has such sharp-pointed needles. Its cones are equally distinctive. They are coarse in appearance and bear cone-scales which are armed with stout spines. They are from three to four inches long and usually occur in clusters of three, five or seven, and sometimes more. These distinctive cones often persist for many years. No other pine native to North America has cones similar to those of the table mountain pine. The preference of this tree for poor rocky soil and exposed situations may also help to identify it. When grown in the open its lateral branches persist on the main stem all the way down to the ground, but if grown in dense mixed stands the trunk becomes clean, and the resultant wood is quite satisfactory for general use.

The table mountain pine cannot be classified as a commercial timber tree of much importance, but it should not be despised for it has some merits. As forestry practice becomes more intensive this tree will be utilized in protection forests on steep mountain slopes where it will help prevent erosion and build up productive forest conditions and at the same time produce wood which may be used to advantage for ordinary purposes.

There is a foreign species of hard pine that has been introduced so extensively in the northeastern part of the United States that it may be regarded as a naturalized member of the forest. It is the Scotch pine, a native of Europe, where it extends from the Sierra Nevada Mountains of Southern Spain and Northern Italy to latitude 70 degrees on the west coast of Norway; thence, east through Lapland and Siberia, along the Arctic Circle to the region of the Amur, and thence through Asia Minor to Persia.

Scotch pine has taken a prominent part in the development of European forestry. It is one of the major forest trees of continental Europe, where it has been given a forest trial extending over more than 100 years, and during that time has shown up some commendable silvical traits. Its rapid growth during youth has been heralded widely, and probably is responsible for an overestimation of its real commercial value. It does grow rapidly in youth, but just like a horse which leads at the end of the first heat is not always the winner of a race, so the forest tree which leads in height-growth at the end of the first or second decade will not necessarily rank first at the end of the rotation—the harvest time of the forest crop.

Scotch pine has been planted widely throughout the eastern part of the United States. During the past fifteen years more than one and one-half million trees of this species have been planted upon the State Forest of Pennsylvania. Most of them are making a satisfactory growth, and experience has shown that Scotch pine is very modest in its soil requirements; hence, well adapted to the sandy soil so common on the mountain sides of the northeast. It will grow satisfactorily upon almost any soil, excepting compact clay and swampy or peaty soils, but thrives best in a deep, loose, and rich sandy soil.

HOW TO TELL THE SCOTCH PINE

The needles are grouped in clusters of two. The cones occur at the end of a season's growth. Note drooping small cone at end of new growth bearing pin-featherlike clusters of needles.

Scotch pine may be distinguished from the pines native to the northeast by the reddish appearance of the upper part of the trunk and adjoining branches. The bluish green leaves which are 1½ to 3½ inches long, and the backward pointing cones are also distinctive. It has rougher twigs than the Jersey or scrub pine, and its needles are shorter than those of the red and pitch pine, longer than those of the jack pine and scrub pine and blunter-pointed than those of the table mountain pine.

All the trees described in this article may be classified as ordinary forest trees. None of them are "super-trees" but all are worthy a place in our forest structure, and if protected carefully and handled properly will produce wood and other forest products urgently needed by man.

THE PINE AN EMBLEM---BY F. ROGER MILLER

THE American people have grown wonderfully in unselfish service—in Christian service. I wonder if we fully realize just how much we have grown! To me the Southern Pine is emblematic of our progress.

The seed springs into life amid the shadows of the ancient forest; the plant so tiny, so delicate that it is lost in the tangled grass that surrounds it.

With fertile soil below and a ray of sunshine from above, it begins to climb and climb and climb. And one day it stands alongside the sturdy oak a century old.

But the growth of the pine is ever upward, and it continues to climb heavenward until its plumed head towers above every other tree of the forest, and the pine looks out upon the whole world.

A few years ago the American spirit of service was born beneath the shadows of Conservatism, and amid the tangled bramble of Individualism and Commercialism. Selfishness surrounded us on every side, and the winding trail through the forest was a narrow rut left by the wheels of Custom and Habit.

Today our vision extends beyond the distant horizon, East and West, North and South, and to the remote corners of the globe.

And we respond to every call for service, whether it be from the homeland, or the forgotten places of the earth.

As the pine yields its all to the betterment of humanity and to the progress of civilization, so we are learning that we came into life that we might leave the world better than we found it, that our value upon earth is measured solely by the service we perform.

EVERGREENS

BY F. L. MULFORD

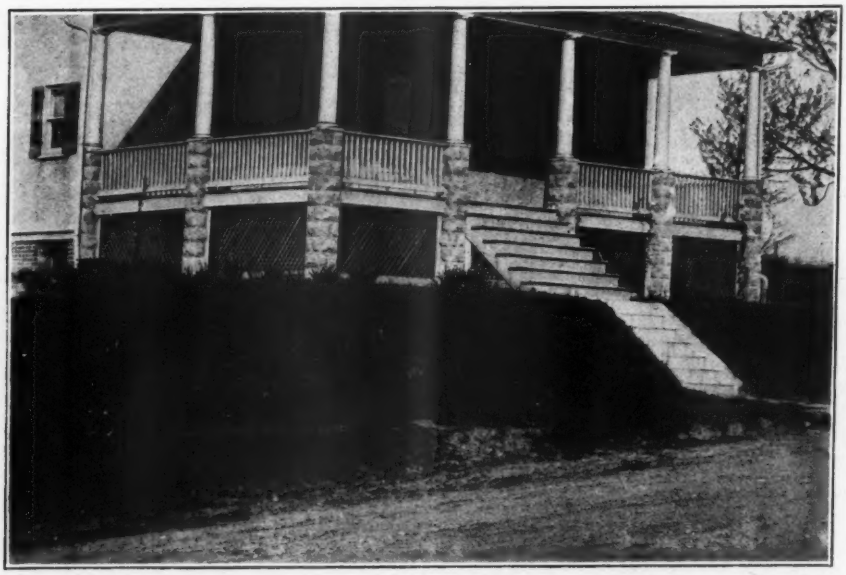
EVERY house needs certain attributes in addition to the presence of a family in which love abounds, before it becomes a real home in appearance as well as in feeling. Among these is greenery about it and shade over it. With these accessories a very simple house may be made to appear homelike. This can be done with little expense for any house except one that is built close against the sidewalk and its neighbors in the heart of a city. A tree or two would provide the shade and the seeds of a few annuals would provide the other green for a summer. Of course, for more permanent results woody material should be used that would provide some winter effect even when it had no foliage, and would give an adequate setting earlier in the spring than could be provided by plants grown from seeds each year.

Although a good combination of deciduous shrubs may give a very pleasing effect during the winter without any evergreens, especially if plants with bright-colored barks are freely used and are appropriately arranged, yet the addition of a few evergreens in the planting adds a touch of green that to most people is very pleasing in mid-winter. A large proportion of the plantings about a home may be of these plants and attractive results may be obtained. Where there is room for a dozen or more plants it probably is not desirable to make the plantings entirely of cone-bearing trees, like the spruces, pines and cedars, as the result is liable to be too heavy and sombre, but such plantings should be varied by the use of a few deciduous plants, which would add variety both winter and summer.

A BEAUTIFUL PLANTING FOR THE ODD CORNER

A group of holly with locust as a background. The thinness of the middle holly is due to its having been transplanted recently. Soon the thick, glossy leaves will come into their own and the bright colored berries make holly a delight in winter.

Evergreens are of two distinct types; the cone bearing trees, which have needles instead of leaves, and the broad-leaved evergreens like holly, box, magnolia, cherry, laurel, mountain laurel and rhododendron. The cone-



BEFORE PLANTING

No matter how attractive the house may be, the foundation lines need to be softened by ornamental planting, and in this instance a simple but beautiful effect was secured through the use of both deciduous and evergreen shrubs.

bearing trees are characteristic of the north, the forests of the extreme north being composed almost exclusively of these trees, while the broad-leaved evergreens are characteristic of the south, there being a long list of kinds available for southern planting that leaves little to be desired in material to provide variety. In almost all of the United States some species of both types can be grown, although the coniferous trees in greater variety are available for the north, while the broad-leaved evergreens are more abundant for the south.

There is a great difference in the general appearance of the various species in the different groups. Not only is there a difference in the green of the foliage but there is also a difference in its arrangement on the branches and in the direction of the growth of the branches that make what is called difference in texture of the plant as seen from a little distance. The difference in texture of the foliage of the broad-leaved evergreens may possibly be somewhat less than with the coniferous trees but then most of them have showy flowers or berries.

Both broad-leaved evergreens and cone-bearing plants have freak forms, the use of which should be largely avoided. Among them are those with variegated leaves, as well as those with yellow and with blue foliage. Among the most abused plants listed by nurserymen is the Colorado blue spruce in its various forms. There are places where one of these plants may be used to advantage with a group of twenty or more other evergreens, but its use alone in the middle of a lawn or with a group of a half dozen or less other trees is not warranted from the standpoint of good taste in planting.

Nurserymen list the evergreens that prove most successful in their respective localities and reliable nurserymen are careful in their descriptions of the kinds that they handle so that the catalogues of near-by reliable nurserymen are the safest available source of information on kinds to use in any community. The trademark "Trustworthy Trees and Shrubs" is coming to be a guide in the selection of reliable nurserymen, as a large majority of the membership of the American Association of Nurserymen that has adopted this trade mark are

AND THE CONTRAST AFTER PLANTING

Abelia, a broad-leaved evergreen of the South, was placed to the left of the steps. Hemlocks to the right. Crape myrtle, hardy phlox, trumpet vine and climbing roses at the left corner, and the "house" was transformed into a "home."

endeavoring to restrict its use to those firms who deal fairly and honestly with their customers. It is believed that this, in a few years, will be a dependable guide for intending purchasers.

August is the time to consider the transplanting of evergreens if it is to be done before winter. The season for their transplanting is different from that for deciduous trees unless unusual care and attention is given to the plants in their new location. This is due to the difference in the character of the plants. Deciduous plants, that is those that shed all their leaves in fall or early winter so that for several months the branches are destitute of foliage, are spoken of as dormant during this season. In other words, the life processes are at their lowest ebb and the external demands of the plant are the least of any season, though they cannot be said to be suspended, as certain processes continue even under these conditions. For example, there is a constant evaporation of water from the tops of deciduous plants all through the winter and if the amount supplied the top by the roots is unduly curtailed for any reason the top suffers and may even die. But the amount of this evaporation is so slight in many parts of the country that these trees may be transplanted at almost any time during the so-called dormant season with reasonable assurance that the roots will be able to supply sufficient moisture to keep the tops alive.

With evergreens the condition is different, as the branches are continually covered with foliage during the life of the plant, the new leaves appearing before the old ones drop. In fact, with some trees there may be three or more crops of leaves on the tree at the same time. These leaves are continually giving off moisture, or, as it is called with leaves, transpiring it. This is going on continuously, more actively when the tree is in active growth or when the atmosphere is dry or the wind is blowing, but to a considerable extent all the time. It is because of this greater need for water that evergreen plants need to be handled differently from deciduous plants.

AN ATTRACTIVE PLANTING OF EVERGREENS ABOUT A HOME

Boxwood and red cedar at the left. Retinospora at the right. Some houses lend themselves best to the entire use of evergreens, and this is an instance of most effective foundation planting, with a distinct dignity and personality.

The time for transplanting evergreens is when the conditions are most favorable for the active formation of new roots combined with the smallest demand of the leaves for moisture. The need for active root growth is so that the plant may as promptly as possible become established in its new location while the desirability of selecting the time of least demand by the leaves for moisture is so that the roots will be required to furnish the least possible amount of water until they have regained efficient contact with the soil.

One of the seasons for meeting these conditions is as early after mid-summer as the late summer or fall rains begin, at least in those sections where winter conditions

will permit of such late planting. This condition prevails in the stippled areas of the accompanying map, which is seen to be about one-third of the eastern part of the country and on the Pacific Coast. In the latter region the planting season begins much later than on the northern Atlantic Coast. Transplanting may continue as late as the ground will be sufficiently warm to induce root formation. Usually the latest advisable date for transplanting evergreens is about the average date of the first killing frost.

Becuse of this necessity of constantly supplying an abundance of moisture evergreens need to be transplanted with a large proportion of their roots in contact with the soil so they will be kept actively functioning. Therefore they are transplanted with a ball of earth adhering to their roots, except in the smallest sizes, which are too small to be of value as ornamentals.

Holes for the planting of evergreens should be prepared before the arrival of the plants so that there need be no delay in planting them on arrival. The holes should be larger than the balls of earth in order that there will be a liberal layer of good soil all about the ball in which new roots may have an opportunity to grow. This layer of soil should be under the ball of earth as well as at the sides. Sufficient well-enriched top soil should be at hand to entirely fill all the space about the ball of earth. The best material for adding to the top soil is well-rotted manure followed in desirability by prepared stock-yard manures, ground bone, fish scrap, tankage, and cotton-seed meal.

Before placing in the hole the outside wrappings and packing material should be removed, but the inside burlap that has been used to help the ball of earth should not be untied. After the plant with this burlap has been placed in the hole a few slits should be cut in the burlap with a sharp knife and then the soil should be packed firmly about the balled plant, burlap and all. After the hole is two-thirds filled with well compacted soil then a liberal supply of water should be added. After this has soaked away the hole should be entirely filled with soil without any farther tamping or tramping. After this is done the ropes that held the burlap in place may be removed and any of the burlap that protrudes above the ground may be cut off. The burlap is left on the ball of roots to prevent any farther loosening of the contact of the roots with the original soil than can be avoided. After having been shipped a considerable distance, with often much handling, and that not always of the gentlest, soil will often come off that up to this point has remained in apparently good condition. Nothing would be gained by removing the burlap, as roots would grow through it even without cutting holes in it, and at longest it would only take a short time for it to rot.

Of course in placing the tree in the first place it is important that it shall be straight before any soil is filled about it. After the hole is filled the tree should be tied

A MIXED GROUP OF DECIDUOUS SHRUBS AND EVERGREENS

This delightful corner is achieved by a mixed planting, and a pleasing, artistic and restful effect has been secured. At this spot the heavy coniferous evergreens alone would have been far too somber.

so as to prevent winds from shifting it from that position, if it is more than 5 feet high or is in an exposed position. It is more difficult to get a tree back in proper position after it is once planted than to keep it so, although the precautions necessary may seem useless at the time. After setting the plant frequent waterings will enable the remaining roots to supply sufficient water until new roots form. A spraying of the tops several times a day is also an assistance in helping to maintain humid atmosphere about the foliage and thus reducing the amount of evaporation. This is not imperative except with large trees or in dry climates. In localities subject to persistent drying winds a protection on the windward side of newly-planted trees is helpful. This could be made of a framework of light lumber covered with burlap. In the humid climate of the Atlantic seaboard such a protection is seldom necessary.

In selecting trees for transplanting nursery-grown stock is preferable, although there are times and conditions when collected stock can be used to advantage. Due to frequent transplanting, the root system of nursery stock is compact with many fibrous roots so that it can be dug easily with a ball of earth that preserves intact a large proportion of the roots of the plant. With the wild plants that may, upon occasion, be collected for planting, the root system consists of a comparatively few roots that have run to long distances in search of food. When these plants are dug, usually a large proportion of these roots are cut off so that only a small proportion of them are secured with the plant, hence the chance of success is much reduced. With very small sizes or by special methods of handling larger sizes it is possible to succeed in transplanting collected trees, but the loss in transplanting is usually very much larger than with nursery-grown stock.

It is not desirable to trim well-grown evergreens at this time. Carefully grown plants are frequently transplanted in the nursery, so that the roots are pruned and encouraged to grow in a compact fibrous mass. When this is followed by careful digging and balling it insures the retention of such a large proportion of the root system that a reduction of the top to balance root loss is not necessary. Further, the character of growth of a large proportion of evergreens, including most of the cone-bearing trees, is such that but little pruning can be done without ruining the shape of the tree. The growth of the most of such trees is from the young wood and if this is destroyed they will seldom start new growth from the old wood in the way that most deciduous trees will do. Therefore, the only pruning that can be done is to trim off some of the young wood, being sure to leave sufficient for the continuation of the growth of every branch. For formal effects, of course, pruning is necessary but this must be done regularly, for if the plant once gets too big there is no trimming it back and beginning over again, as can often be done with deciduous plants, or with many of the broad-leaved evergreens, as holly, box, magnolias and a host of other southern plants.

In order to keep the trees growing well it is desirable to give frequent applications of well-rotted manure to the cone-bearing trees and to keep them well cultivated or well mulched. The same treatment is good for many of the broad-leaved evergreens also, but such plants as rhododendrons and mountain laurel should have annual mulches of oak leaves and no cultivation of the surface of the ground under any circumstances, and no lime or

A GUIDE FOR TRANSPLANTING

The stippled areas show where late summer or fall transplanting may be done with a good prospect of success.

wood ashes even in minute quantities. If the mulch of oak leaves is sufficiently heavy no objectionable weeds will grow, but if weeds should grow they could be pulled without hoeing the surface.

If ornamental plantings are well made it is usually not desirable to stimulate a rapid growth after the plants are well established. On good soil they will usually maintain themselves in good condition without cultivation and with only an occasional application of manure on the surface. As a rule, the principal attention needed is to watch for possible insect attacks and to thin the plantings before they begin to overcrowd. In order to get quick effects all plantings are apt to be made too thick for the ultimate stand. This is entirely proper but attention should be given to thinning as soon as the plants begin to touch, so that the permanent trees will not be ruined before it is done. In the final arrangement it is entirely appropriate for the plants to grow together and somewhat crowd each other, but this should not be permitted in the younger plantings before they have had their final thinning.

TREE STORIES

JUPITER AND THE OAK

By Mary Isabel Curtis

WHEN the Romans, long ago, believed in many gods they worshipped Jupiter as king of all their gods and goddesses. The oak was Jupiter's especial tree and this is the story of how he came to choose it for his own.

There was a band of giants called the Titans, who were Jupiter's cousins and who disputed with him his right to be the king of all the gods. After a great battle Jupiter and his followers conquered the Titans, and Jupiter became the supreme god. But it was a terrible struggle because the Titans were of such gigantic size and had such enormous strength that they were able to pile mountains upon mountains in order to reach up to Heaven and throw Jupiter down, which was what they were trying to do.

After the battle was over, Jupiter was resting in the shade, when suddenly one of the Titans managed to force his way to where the god was sitting, and, rushing up, tried to kill him.

Jupiter seized his great sword and thrust it through the Titan's body and when the giant's blood fell upon the ground a mighty oak tree sprang up right where he had been standing.

"This is the king of trees," said Jupiter, "and I am king of all the gods. From this time the oak tree shall be known as mine, and everywhere it grows men shall remember that I made it mine by conquering my enemies."

This is the story of the oak tree; but there is a little more to it, because this oak, or another one exactly like it, became a very wonderful tree indeed. It lived for many, many years and was known as the Talking Oak of Dodona. When anybody needed help he would go to the Talking Oak and ask what he should do.. Then through the rustling and whispering of its leaves he could, if he were clever enough and could listen hard enough, make out a voice, and this voice would tell him just what would be best for him to do.

I wish, in these days, we could have a talking oak—Don't you?

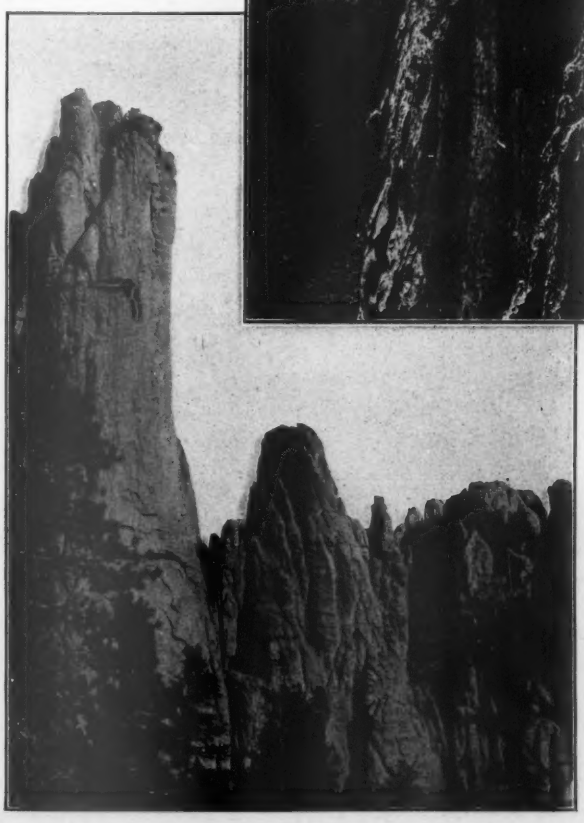
THE SNEEZELESS LAND OF DACOTAH

BY EARL H. EMMONS

WHEN the corn is in the whiskers and the hay is in the stack and the pollen blows profusely, how does it make you feel? Do you snap your lily-white fingers in its face and give vent to a loud and ribald laugh, or do you sneak down alleys with a couple handkerchiefs in each hand, kachooing at every step and wishing you were dead?

If you are of the latter type, then list to the tale of a land that is sneezeless, and if you belong in the former category trail along anyway—you will enjoy the scenery. I am about to refer to that glorious region so little known east of the Mississippi and west of the Rockies—the Black Hills. You may have heard of them through your geography or history. Anyway, in all probability, your ideas are wrong.

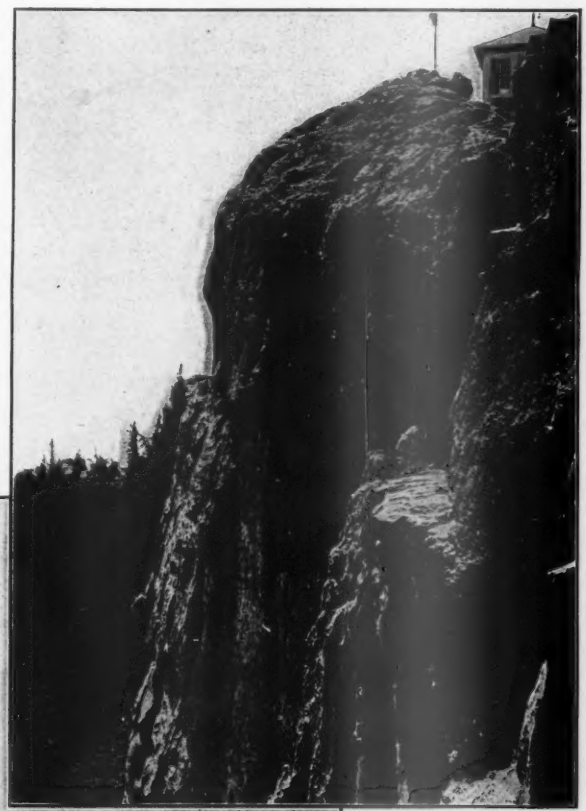
In the first place, the Black Hills are not black at all. They are a very dark blue and green and sometimes purple, which shades off to gray and yellow, but no black. Neither are they hills, unless you call most of the Rockies and all the chains eastward hills, because the altitude here is higher than many of the peaks in the Rocky range and higher than anything between the Rockies and the Himalayas. Thus, outside of being neither black nor hills, the name fits them quite well. However, if they were called Nature's Playground or the Garden of Midas, or something like that, the name would fit better.



ALONG THE HIGHWAY THROUGH THE NEEDLES IN THE BLACK HILLS

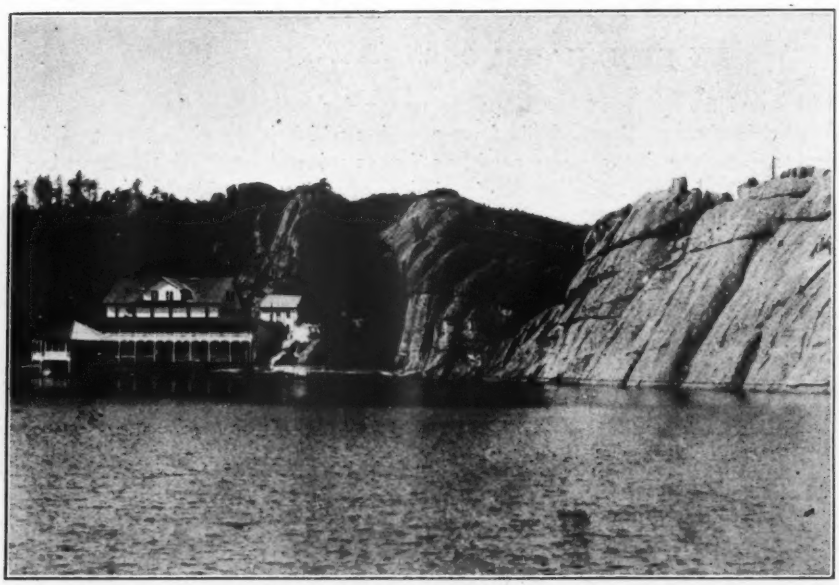
The main reason for such statement is that the Black Hills form a region which is the richest spot of its size on earth, as far as mineral wealth is concerned, while its scenic ability, when you consider not only size, but variety and color, makes the average mountain landscape of this once broad and free land look foolish.

But I started to talk about hay-fever and how to discourage it, and I know of no other place where hay-fever has such a small chance as in these same Black Hills. I do not possess hay-fever, so am unable to say just what it is out here that is so rough on the ailment. It might be the wonderful air, and it is wonderful, besides which there is a great deal of it which has never been used up at all. Or it might be the scenery. There are some things the Hills do not have, but they do have scenery. You can tell the world. For instance, there's Harney Peak, named after General Harney, the Indian fighter. He discovered the peak in 1855 and climbed it with his staff officers. The party spent several days on the summit, during which time they planted a pole and flew the stars and stripes from this highest point in the United States east of the Rockies. Incidentally, they celebrated the event with a large



THE HIGHEST POINT BETWEEN THE ROCKIES AND THE HIMALAYAS

The United States Forest Service Fire Observatory on Harney Peak near the top of the world.



SYLVAN LAKE, A VERY POPULAR SUMMER RESORT OF THE BLACK HILLS

and ribald champagne party, though such things doubtless should not be mentioned in these Volstead and pussyfoot times.

The Peak is nearly eight thousand feet above sea-level and commands a view of four states, approximating about forty thousand square miles of view. There are few places a person can go and see so much for the money. The Hills are now a national park under the jurisdiction of the United States Forest Service and an observatory is maintained on Harney Peak, where a guard is stationed who watches for forest fires and beautiful female tourists.

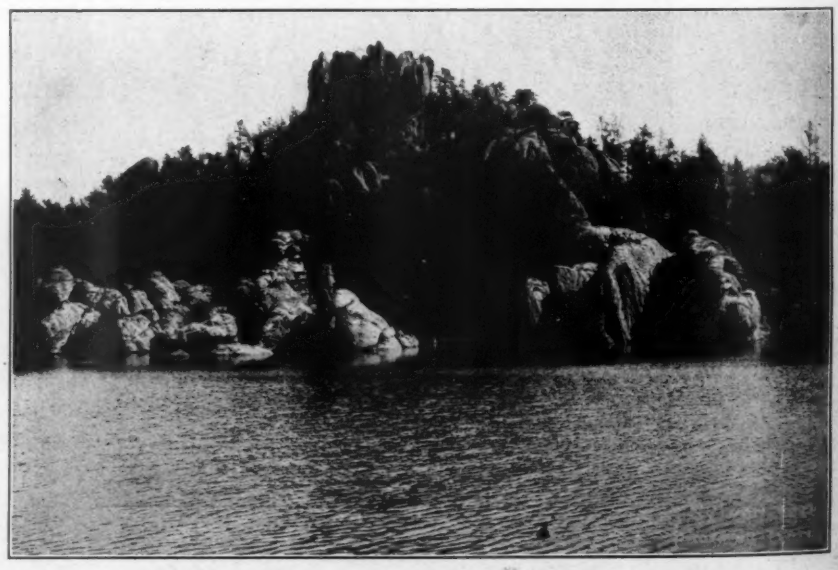
One of the interesting things in the Hills, to the average stranger, is the work of the Forest Service, which maintains several fire guards on the highest peaks, while scattered throughout the entire territory are ranger stations, where live the men of the forests who fight the conflagrations.

There is an average of about thirty fires a summer in the Hills, twenty per cent due to carelessness, the rest mostly caused by lightning. Since the Forest Service took over the Black Hills in 1906, it is estimated that several hundred thousand dollars worth of timber has been saved from destruction owing to preventative measures and prompt action.

Harney Peak, which is the central, highest and most important of the fire stations, is three miles from Sylvan Lake, the big summer resort of the Hills and one of the most beautiful spots God ever made, assisted by the State of South Dakota. Here is an ice-cold lake, clear as crystal, sixty feet deep, the shores largely of gigantic granite rocks and the whole perched up more than six-thousand feet above the sea. Also it is filled with delicious bass and trout, though I do not know how they got up that high.

At the lake is a large hotel, together with several cottages, cabins and camp grounds which take care of the thousands of tourists and hay-fever hounds who visit the spot each year. A few months ago the State of South Dakota took charge of the resort and a great many improvements have been and are being made upon it. Those who have visited the Lake during the past few years will doubtless be pleased to know that when they come back this year the roof will not leak any more, besides which the dancing pavilion will be enlarged, there will be a pool hall, electric lights which light, plenty of running and jumping water, several new baths, a garage and all the modern conveniences, except mosquitoes.

The State and Forest Service also have built several new roads and repaired the old ones throughout the Hills so that it no longer is necessary to leave the



A BEAUTIFUL SCENE ALONG THE GRANITE SHORES OF SYLVAN LAKE

THAT MAJESTIC GROUP OF GRANITE SPIRES, THE NEEDLES, BLACK HILLS

Henry in a ditch and walk four miles to get any place. From Sylvan Lake are trails to Harney Peak, the Needles and the Pools. The Pools are a series of beautiful granite basins set in the bottom of a deep, ragged canyon and surmounted by what is known as the Guardian, a huge boulder in the perfect shape of a man's bust. It is one of the curiosities of the country. The Needles is a group of slender spires, set around a flat oval a quarter of a mile in diameter. The spires rise to heights of six hundred feet, many standing alone, others in chains. Here may be seen enough freak-shaped rocks to last the average person a lifetime and their like is not duplicated anywhere in the country. Besides this, there is Hot Springs, the name being self-explanatory. Here are more than a hundred mineral water springs which maintain a warm temperature throughout the year, so that the people living here are sure to have plenty of hot water if they have nothing else. The springs possess curative qualities good for a number of ailments and were highly prized and held sacred by the Indians until the whites discovered what was going on and then the Red Brother had to hunt up something else when he was sick. The springs are all boxed up now and it costs money to bathe in them, but the charge is low and the benefits and pleasure derived are well worth the investment.

A few miles from Hot Springs is another natural wonder, the same being Wind Cave. The air of the cave possesses qualities which give immediate relief to sufferers from colds, asthma and hay-fever. Even persons not bothered by such things should visit the cave, however. The cave is a government institution and guides are furnished to herd the visitors through the tunnels twice each day, the trips being at 9 A. M. and 2 P. M. on the dot, and no deviation from this schedule.

The cave consists of more than a hundred miles of long, narrow passages which at frequent intervals have branches leading off into chambers, but, of course, one need not go the entire route. The walls and ceilings are covered with elaborate crystal formations and among other things the cave contains one chamber, called the Fair Grounds, which is several acres in extent and is the largest natural underground room in the world. That is something to think over and remember.

So much for the cave. In passing, however, it might be well to remember that caves, several hundred feet underground, are likely to be damp and evening dress is not the best costume to wear on the trip. Hiking clothes are much more appropriate. No, I do not know where the wind comes from. There is a continual current

CEDAR PASS, BAD LANDS, SOUTH DAKOTA, WITH A REPLICA OF THE WOOLWORTH TOWER AT THE EXTREME RIGHT

THE JAGGED SIDE OF SPEARFISH CANYON IN THE BLACK HILLS

blowing from the cave, but its source has never been discovered. Some people claim it is due to reaction following the lectures of the guides, but I cannot say.

A few miles from Hot Springs are found the Cascade Falls, where seven mineral springs gush forth, one of these, known as the Big Geyser, gushing out sixty barrels of water per minute. This is an estimate, merely, not an exact measure, as the spring is not fitted with a water meter.

Other points of interest in the Hills include Bell Fourche, a town well stocked with early-day tragedy and history. It is now a flourishing city and the largest shipping point for range stock in the United States. Here is held an annual roundup, rodeo, stampede or whatever name you know these frontier sports by. It takes place July 5, 6 and 7.

Another annual roundup is held in Interior during August. Interior is a good place from which to see the Bad Lands, as it is in the heart of this formation and adjacent to many miles of rough view. Scenic also is a good point from which to tour the Bad Lands, and near here is the famous Sheep Mountain which displays some of the most uproarious scenery to be found anywhere.

A few miles further west and all in a bunch is Sturgis, Bear Butte and Fort Meade, which, incidentally, is perhaps the finest military camp in the West. It was for years the most important frontier outpost and it was here the famous horse Commanche spent many years of his eventful life. Commanche, for the benefit of those who may not have met him personally, was the sole survivor of the Custer fight. He was found standing in a river two days after the battle and he was full of Indian bullets and indignation. He was taken carefully back to the fort, nursed to health and lived a decade or more thereafter. He was buried with military honors.

Thus we have peaks, lakes, springs, falls and caves in the Hills and about the only thing needed is a canyon. Well, there is a canyon. Spearfish Canyon it is called, and for real rough and reckless perpendicular scenery it is quite a ditch. Many people claim it is fully as good as the Grand Canyon, only on a smaller scale. People holding this view, of course, are not natives of Colorado and, as a matter of fact, seeing Spearfish Canyon would not really spoil a trip to the Grand, but as far as canyons are concerned the Spearfish is no slouch by any means. It

THE PEAK-RIMMED TOWN OF CUSTER, SOUTH DAKOTA, THE FIRST SETTLEMENT IN THE BLACK HILLS

may not be as big as some, but it certainly has the general idea and one of the finest trips in the Hills is the ride through this trench on the railroad which runs up its entire length.

The only drawback attached to the trip is that the sightseer is not good for anything for two or three days after making the journey. He is too busy rubbing cocoa butter on the roof of his mouth where it is all sun-burned, and changing the splints on his neck. That is the only trouble with Spearfish Canyon. The sides are both built too close to the railroad track. When there is several thousand dollars worth of scenery around a person and it is nine feet away and nine hundred straight up, it becomes quite a task to see it properly. It seems to me the railroad could institute a novel idea and overcome this thing by running a string of flat cars fitted up with mattresses so the visitor could lay on his back and be in a natural position to look where the looking is at its best.

KNIFE BLADE ROCK IN THE BLACK HILLS

While in Spearfish the tourist also may see the government fish hatchery if his taste runs to such things. Of course it isn't much to see and the seeing would doubtless do one very little good, but it is there, and to people interested in that sort of thing it is quite interesting.

Rapid Canyon also is quite a groove if one is out looking for ruts. It was built near Rapid Creek and the creek got into it some way and couldn't get out. It did a good job of trying, however, and it doesn't run more than twenty steps without switching to one side or the other in an evident effort to climb the cliffs. Consequently, the road through the Rapid Ravine runs largely to bridges, there being scores of them in every mile of road which doubtless is the largest and most cumbersome number of bridges to the inch ever turned out, except by the Associated Order of Allied Dentists.

Then there is Crystal Cave and Jewel Cave, small but very select, and containing geological specimens as fine as any in the world, and there is the Wind Cave Game Park and the State Game Park, where may be seen deer, antelope, elk and buffalo.

Among the towns there are several of interest. Custer, the site of General Custer's headquarters in 1874, and the first town in the Black Hills, is famed as being the spot where the first gold was discovered in this region. A tablet marks the spot. Custer is the heart of the Hills and from here easy access may be had by rail and road to all the points of interest. It is six miles from Sylvan Lake and nine from Harney Peak. It is also near Wind and Jewel Caves, Hot Springs and the Needles.

Deadwood, the second, and most beautiful town of the Hills, is the point from which to see Roosevelt Mountain and Monument, the White Rocks, Spearfish Canyon, Bear Butte and the Homestake Mine In Deadwood are the graves of Wild Bill Hickok, Calamity Jane, Preacher Smith, Captain Seth Bullock and many other notables. Captain Bullock, first sheriff of the Hills, U. S. marshal, rough rider and a close friend of Roosevelt, was the man responsible for the dedication of Roosevelt Monument to the memory of our greatest American. (This, of course, is put in as a personal opinion. Democrats may differ.)

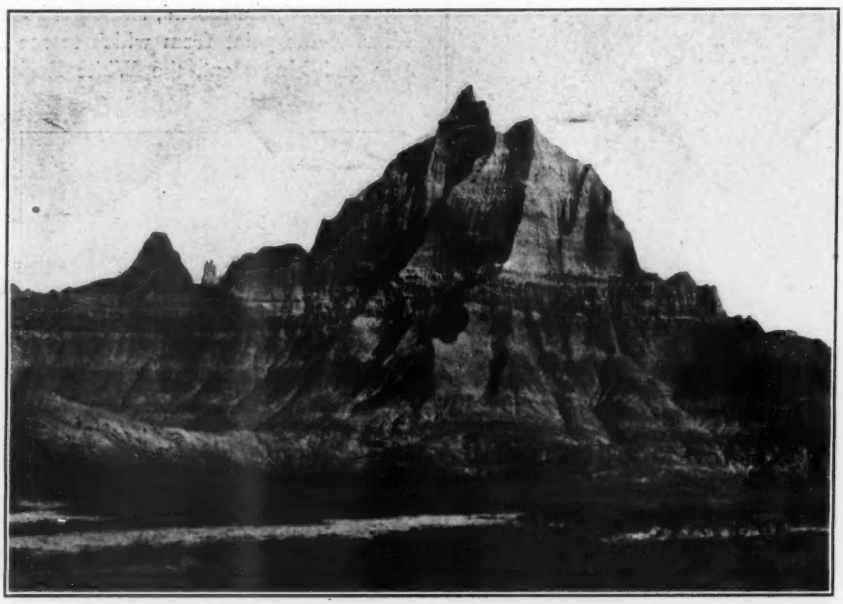
THE HUGE PILE KNOWN AS THE DEVIL'S TOWER.

Speaking of monuments, there is a natural one in the Hills which should not be overlooked. It can't be overlooked if one gets within a hundred miles of it, the same being Devil's Tower, which has been designated by the government as a national monument. The Tower is the only one of its kind in the world, being a great rectangular

obelisk of crystalized stone rising almost perpendicular to a height of 800 feet, one mile in circumference and composed of the largest crystals ever discovered.

The famous Homestake Mine is four miles from Deadwood and located in the city of Lead. The mine goes down a half mile or more, with shafts every hundred feet, comprising hundreds of miles of holeage. It is the largest gold mine in the world, which is another item to remember. The visitor is welcome to prowl all through the surface workings and see the process from beginning to end and the only restriction is that he is requested not to talk or make undue noise while visiting the stamp mill. The Homestake is owned largely by the Hearst estate, but outside of that it is a wonderful institution.

Then there is Rapid City, called by the inhabitants the Gateway to the Black Hills, though called some other things by different people. Rapid City was started by a group of men who came to the Hills after gold but had no luck. They did have foresight, however, and recognizing the spot as the logical trail to the Hills from the East, they decided to start a trading post at this point and thus gather in some of the wealth of the Hills without having to dig for it.



FITTINGLY NAMED—DEVIL'S CASTLE IN THE BAD LANDS OF SOUTH DAKOTA

Many of the merchants of Rapid City today are evidently equipped with that same foresight as displayed by the towns's founders. Anyway, they saw me coming.

Of course, there are other ways of entering the Hills, but there are some interesting things in and near Rapid City which are worth while seeing and do not cost more than they should. Among these are the Indian School, the State School of Mines, Rapid Canyon and Hangman's Hill, where the pioneers were accustomed to drape cattle rustlers and horse thieves during the early days.

A few miles east of Rapid City are the world-famous Bad Lands, which are as wonderful as the Black Hills are beautiful. The Bad Lands, without a doubt, is the most God-forsaken-looking spot in the world, and yet they are so marvelous that it is impossible to describe them satisfactorily. Just to show how impossible they are of description, I will try it.

From ground covered with brush, thistles and cactus, there rise abruptly on every hand gigantic peaks, pinnacles and turrets of hard clay. The clay is streaked with layers of every color of the rainbow, but the general scheme is a dead grayish white and the formations are the most elaborate and grotesque to be found anywhere outside of Hell.

In fact, General Harney claimed the Bad Lands were "Hell with the fires out," but if he had been there on a good hot day in August he would probably have shortened his description by about four words, and if Dante could have seen them before he wrote his book he would have had a lot more local color to put into it. To me, the Bad Lands suggested nothing so much as the grave yard of the Universe. I never saw anything with such a long-dead appearance in my rather long and much misspent life. But there is no use trying to describe the Bad Lands. They must be seen to be appreciated and some people, even after seeing them, can hardly believe it. There is one thing to remember concerning the Bad Lands. You may love the great outdoors and enjoy sitting in the lap of Nature, but do not try it in the Bad Lands. I got too close to Nature out there and I got up in somewhat of a hurry with certain portions of my anatomy so full of cactus I looked like a porcupine. There are more varieties, shades and shapes of cactus in that region than there are hound dogs in Interior, which is quite some, and any time you sit down anywhere in the Bad Lands you get right up again and your entire day is spoiled.

As far as minerals are concerned the Black Hills has all of them. There is no known mineral not found in the Hills. Of course, only a few are in quantities sufficient to be payable as mining propositions, but they all are there, together with representatives of every known gem, except the pearl, and if oysters could climb mountains there doubtless would be pearls also, thus making it unanimous.

Among game the Hills contain deer, elk, wolves, coy-

otes, beaver, fox, tourists, wild-cats, grouse, jack-rabbits, ducks, geese, burros and numerous other varieties, besides which bass and trout are plentiful in all of the streams.

For those who like flowers, the Black Hills modestly offer more than nine hundred different kinds. One spot, near Custer, was given the name Floral Valley by General Custer and a prominent botanist later declared that this valley contained a larger variety of wild flora than any other single spot in the world.

THIS IS A TYPICAL RANGER STATION IN THE BLACK HILLS FOREST RESERVE

As to roadways, most of the best-known routes to the West go through or near the Hills, besides which there is the Chicago, Northwestern, the Chicago, Burlington & Quincy and the Chicago, Milwaukee and St. Paul rail lines.

The automobile roads include the Black and Yellow Trail from Chicago, via Rapid City, Lead and Deadwood to the Yellowstone Park through the Cody entrance; the Scenic, on the George Washington National Highway from Savannah, Georgia, via Sioux Falls through the Bad Lands, after which it joins the Black and Yellow Trail; The American, from Lead and Deadwood to Miles City, Montana, the Loup River Shore Line from Omaha via Fremont, Nebrsaka, Long Pine and Rapid City to Lead and Deadwood; the Denver Highway, through Hot Springs, Sylvan Lake and other points in the Central Hills. This is perhaps the most picturesque route of all, as it strikes the best part of the Hills and continues up to Deadwood and Lead, Sturgis, Fort Meade, Government Irrigation Dam and Spearfish Canyon.

There are good hotel and garage accommodations throughout the Hills, besides which the Forest Service has established public camp grounds all along the highways. These grounds are fitted with stoves, water and wood, while almost every town has a Commercial Club where tents and equipment may be rented.

The climate in the Hills is wonderfully mild and even, with little wind. There are few insects and no poisonous snakes. The open season for tourists runs from May to November.

How's that?—mountains, lakes, hot and cold springs, caves, canyons, mines, birds, fish, game, flowers, towns and items of historic interest—all gathered into a compact bundle easy to handle. Can you beat it? You can not. If you haven't seen the Hills you certainly should and if you have, then you will again and there's that.

NIGHT IN THE BLACK HILLS

BY EARL H. EMMONS

The moon rides high in an azure sky
O'er the mountains high and still;
Its slender beams with their silver gleams
Touch the valley, stream and hill.

At timber line stands the stately pine,
Like sentinels of the night;
The shadows creep over gulch and steepe
In the ghostly, paling light.

Each lofty peak in the moonlight streak
Is bathed with the rainbow's tones
From the sparkling dots of mica spots
Like a million precious stones.

From a far-off vale comes a coyote wail,
With its weird, falsetto trills;
A fragrant breeze fans the rustling trees—
It's night in the Great Black Hills.

THE famous cedars of Lebanon were almost wholly destroyed during the World War, according to a writer in a San Francisco periodical. The trees date back to the earliest times. They were historic during the wars of Sennacherib, 608 years before Christ, as described in the psalms of David. Pliny, the Roman historian, claimed their wood to be everlastingly durable, and the Arabs believed the trees to exist for all time. Timbers unearthed in the ruins of ancient Assyria have been found practically unchanged after 2000 years and more. In olden times the oil from the trees was used as a cure for leprosy, and it was used by the Romans to preserve their manuscripts. Individual trees were often 42 feet in circumference and 90 feet in height, with a wonderfully beautiful spread of branches.

During the late war the Turks cut them down for fuel for locomotives and then the opposing forces continued their destruction for fuel and other military purposes.

FOREST WASTE AND FIRE LOSS

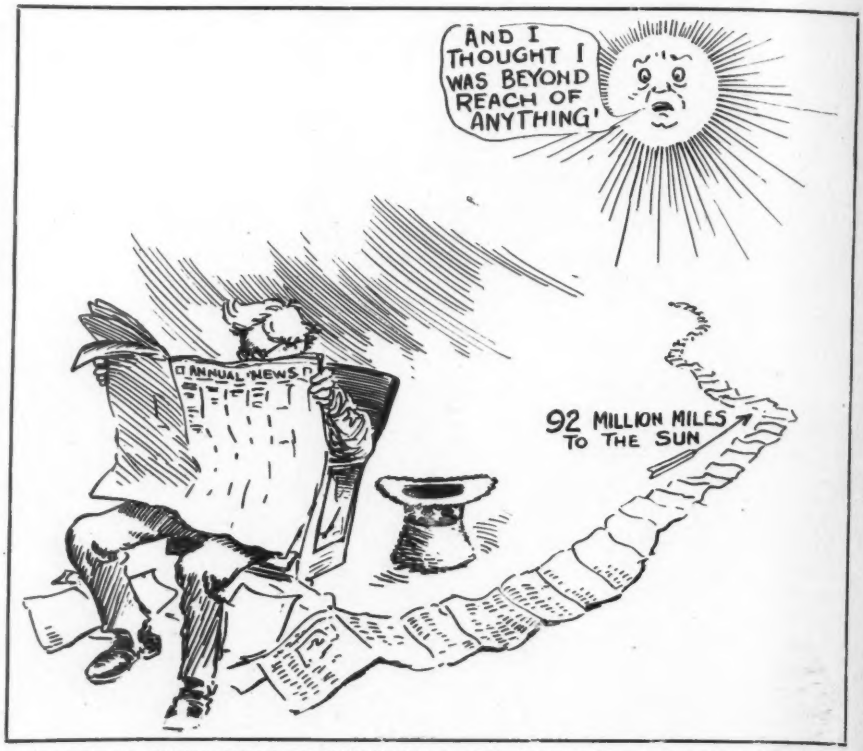
BY ARTHUR NEWTON PACK

DID you ever stop to consider what a part the old family wastebasket plays in the depletion of our forests? It may not be the cause, but it certainly represents the end for between one and two million trees every year. Except for library and editorial files nearly every copy of some twenty-five hundred different daily papers and fourteen thousand other periodicals published in the United States finds its way sooner or later to the wastebasket. The amount is almost inconceivable.

Our annual consumption of two million tons of newsprint a year means a strip of paper as wide as the New York Times and about forty million miles long. Just as a measure of distance, remember that the sun is ninety-two million miles away. It would also make a two-foot wide ribbon of newspaper around the world 1600 times.

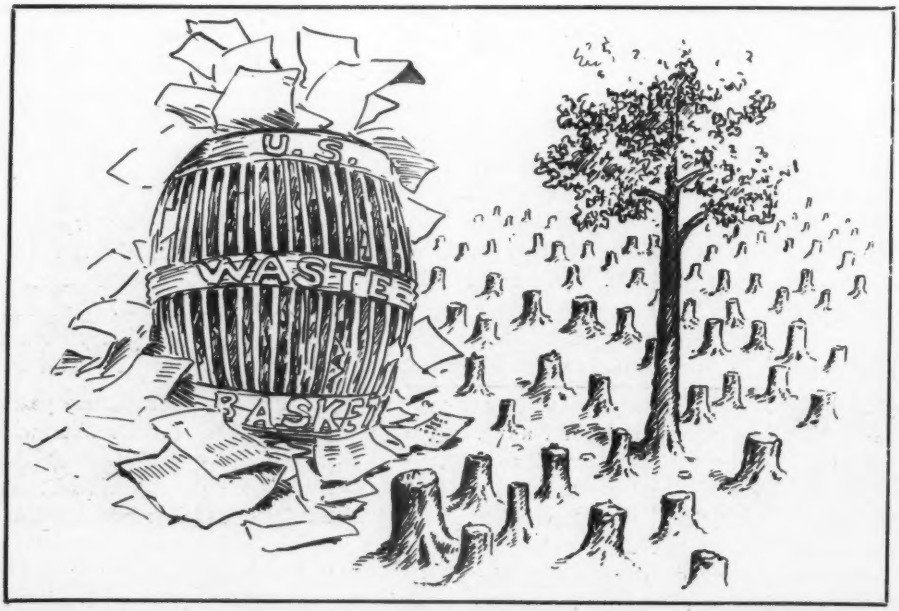
"I could get along without half of my daily newspaper anyhow," says the reader. "Look at those advertisements—pages of them!"

Very true; but the trouble is that the newspaper and periodical managers could not give us the reading matter and stories that we like without those advertisements.



OUR ANNUAL CONSUMPTION OF NEWSPRINT IS EQUIVALENT TO A TWO-FOOT STRIP OF PAPER FORTY MILLION MILES LONG

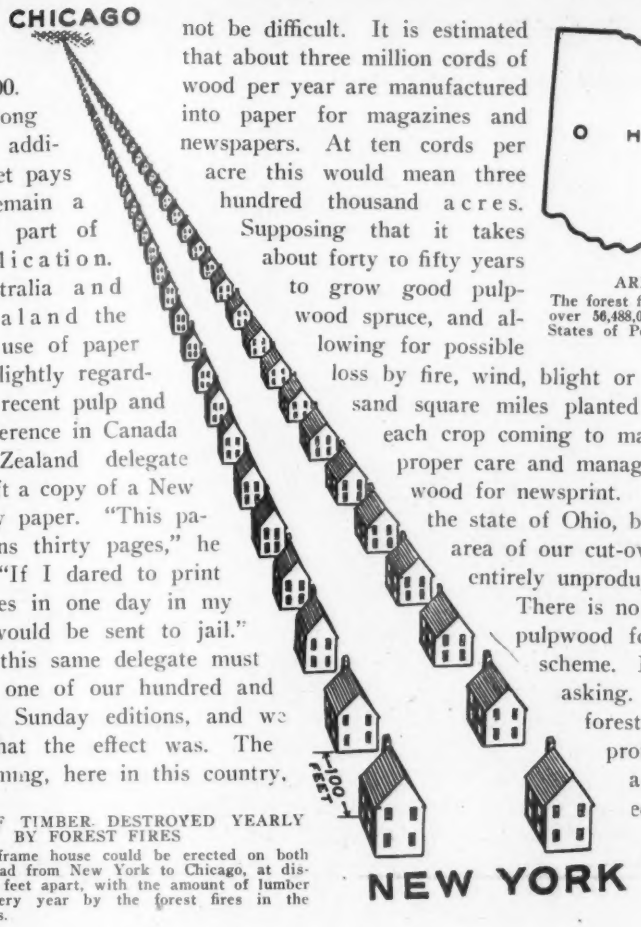
A large metropolitan daily weighs in the neighborhood of four ounces. A Sunday paper may weigh a couple of pounds. Of course, part of that weight is printer's ink; but we can probably offset that against the paper lost through waste in the printing, over-run of copies, etc. Except on Sunday you pay three cents for your copy. At the commercial rate of five cents a pound for the paper alone, where do the editors, the reporters, the printers and the owners come in? Why, through the advertising profits. Any man who has ever tried getting his advertisement printed knows what it costs. For a double spread in a single issue of the Saturday Evening Post, for instance, the ad-



EVERY DAY NEARLY FIVE THOUSAND GOOD-SIZED TREES FIND THEIR WAY BACK INTO OUR EVER-OPEN WASTEBASKETS

vertiser is willing to pay $10,000. Just so long as every additional sheet pays it will remain a permanent part of any publication.

In Australia and New Zealand the wholesale use of paper is not so lightly regarded. At a recent pulp and paper conference in Canada a New Zealand delegate waved aloft a copy of a New York daily paper. "This paper contains thirty pages," he shouted. "If I dared to print thirty pages in one day in my paper, I would be sent to jail." Doubtless this same delegate must have seen one of our hundred and sixty page Sunday editions, and we wonder what the effect was. The time is coming, here in this country,



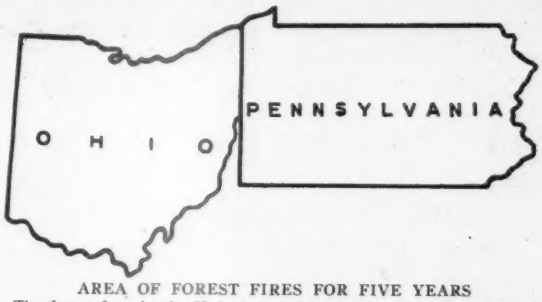
AMOUNT OF TIMBER DESTROYED YEARLY BY FOREST FIRES

A five-room frame house could be erected on both sides of a road from New York to Chicago, at distances of 100 feet apart, with the amount of lumber destroyed every year by the forest fires in the United States.

when the economic law of necessity, a law far stronger than any enforced by a mere jail penalty, will bring our own publications to some sort of retrenchment.

Authorities agree that that time is not far distant. Already more than one-third of our pulpwood comes from across the Canadian border, and Canada, profiting by our mistakes, is now taking steps to forbid the cutting of timber at a rate more rapid than its growth. That means primarily that our annual importation of Canadian pulpwood has practically reached the maximum, and for the other two-thirds at least we will have to look after ourselves.

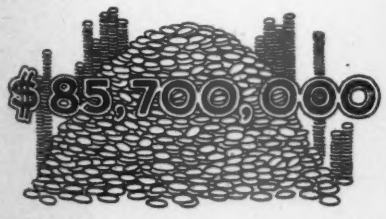
If we once squarely face the facts, the solution of the problem will not be difficult. It is estimated that about three million cords of wood per year are manufactured into paper for magazines and newspapers. At ten cords per acre this would mean three hundred thousand acres. Supposing that it takes about forty to fifty years to grow good pulpwood spruce, and allowing for possible loss by fire, wind, blight or failure of seeding, a tract of thirty thousand square miles planted with forty successive crops of timber, each crop coming to maturity at one year intervals, would under proper care and management, furnish a perpetual supply of pulpwood for newsprint. This means an area a little smaller than the state of Ohio, but represents less than one-tenth of the area of our cut-over lands, most of which are now almost entirely unproductive.



AREA OF FOREST FIRES FOR FIVE YEARS

The forest fires in the United States in the past five years burned over 56,488,000 acres, an area greater than that included in the States of Pennsylvania and Ohio.

There is no question but that a perpetual supply of pulpwood for all needs is a possible and practical scheme. It will not, however, come merely for the asking. There must be, first, a proper national forestry law with adequate provisions for fire protection and government reforestation on a scale large enough to demonstrate the economic soundness of the idea; second, every state must adopt thorough-going forestry principles with provisions to protect growing timber from exorbitant taxation; and, finally, with these laws as a basis, the pulp and paper industry, together with all other wood using industries, must be made to see that in practical reforestation and conservation lies their only salvation. To accomplish these three things will require the united efforts of every man and woman. We should not leave to any group of foresters and legislators the sole initiative in solving such an important economic problem; but, by the continued expression of our thought and conviction, we can urge those groups to supply our imminent need. This can not be brought

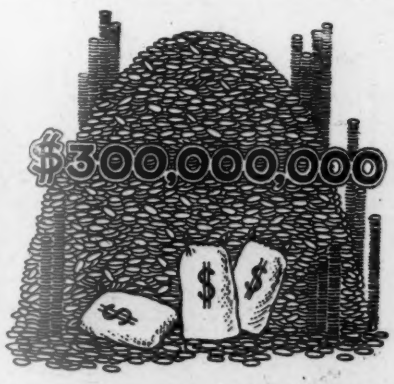


FIVE YEARS' FOREST FIRE LOSSES

This represents the value of timber and property destroyed in the last five years by forest fires, most of which could have been prevented by adequate fire protection work.

BUSINESS LOSES THIS SUM YEARLY BY DESTRUCTION OF LUMBER

If loss by forest fires is stopped the business interests concerned in building construction will make profits of $400,000,000 a year, the material saved put into houses.



BANKERS AND REAL ESTATE MEN LOSE THIS YEARLY

Profits of $300,000,000 through the sale of lands and loans on houses are lost every year by the destruction of timber in the forest fires which rage from one end of the country to the other.

about by silence or a non-committal attitude. Our expression must be definite and emphatic.

The United States Forest Service is authority for the statement that forest fires annually destroy two billion feet of timber, or material enough to build a five-room frame house every one hundred feet on both sides of a road extending from New York to Chicago. With four people to a house, these 100,000 or more buildings would provide a home for nearly one-fourth our yearly increase in population—a number sufficient to populate a new city each year the size of Cincinnati, New Orleans, Minneapolis, Kansas City, Missouri, or Seattle. More than 160,000 forest fires have occurred in the United States during the past five years, 80 per cent of which were due to human agencies and therefore preventable. These conflagrations burned over 56,488,000 acres—an area greater than that included within the States of Ohio and Pennsylvania—and destroyed $85,700,000 worth of timber and property. If this needless waste were stopped and the material thus saved put into houses, the various business interests concerned in building construction, such as lumber dealers, carpenters, masons, and supply houses, would, it is estimated, benefit to the extent of more that $400,000,000 annually. Bankers and real estate dealers would also profit through the sale of lands and by loans on homes to the extent of an additional $300,000,000. Forest fires are therefore of vital concern to not only the everyday citizens, but to every business man and laborer.

Forest protection goes hand in hand with national prosperity. Next to food and clothing, wood is the most indispensable product of nature. Without wood there can be no agriculture, no manufacture, no commerce. Forest fires destroy life and property, impoverish the soil, drive away animal life, cause floods and drought, and make waste the playgrounds of the people.

EXPERIMENT STATION OPENED AT ASHEVILLE

A new forest experiment station, the first in the Eastern States, has just been established at Asheville, N. C., by the Forest Service of the United States Department of Agriculture. Steady depletion of the Southern Appalachian timber supply has been responsible for the location of this station in the East, and the object of the work to be conducted will be to secure the information needed by foresters to determine the best methods of handling forest lands in the southern mountains.

For many years the United States has depended for a large part of its hardwood timber products on North Carolina, Virginia, West Virginia, Kentucky, Tennessee, Alabama, Georgia and South Carolina, states the Forest Service. The crest of hardwood production in this region, with a cut of approximately 4 billion feet, was reached in 1909. In 1918 the production had fallen off nearly 60 per cent in the face of rising lumber prices and increasing demands. There is every reason to expect the same trend to continue, owing to the steady decrease in timber supplies. This involves one of our most important hardwood forest regions and many important dependent wood-using industries, including railroads.

The country as a whole will, in the future, have to depend on the steep mountain slopes of the Southern Appalachians for a very large percentage of its high grade hardwood supplies. The bulk of the remaining hardwood stands is now in the Lower Mississippi Valley, and it is practically certain that a large part of this rich bottom land will be used for agricultural purposes, when the timber is removed. The entire country should, therefore, be directly interested in bringing about the growing of hardwood timber in this region, where ideal conditions exist for its production.

The general timber situation in the United States is exceedingly serious, foresters say. Something like three-fifths of our original timber stand has been destroyed or utilized, and an appreciable percentage of the remaining two-fifths is made up of inferior second-growth. One-half of the timber we have left is in the three Pacific Coast States—Washington, Oregon, and California—while 90 per cent of our timber markets lie east of the Rockies, and a very large part of that 90 per cent east of the Mississippi River. Excessive prices for lumber, pulp paper, and practically all wood products have resulted from this situation.

The Appalachian forest experiment station will have to deal with the problems of a forest area approximately equal to twice that of prewar Germany. It will have to cover the problems of a large number of valuable species of trees, including 10 or more oaks, several hickories, which have, so far as is known, no foreign equivalents, yellow poplar, basswood, black walnut, cherry, specialty woods of high value, several valuable ashes, chestnut, and a number of other hardwoods. White pine and spruce and some southern pines are also well represented in this region.

Special problems under consideration are: The conversion of extensive cut-over, fire-damaged, and relatively unproductive forests into rapidly growing forests of the best species; methods for replacing the blighted chestnut forests; fire protection; the relation of grazing to forest growth and reproduction; methods of management which will produce the greatest protection to municipal watersheds; the greatest regulation of stream flow; the prevention of erosion. Studies in the quantity of timber of different species that can be successfully grown, and the development of methods for artificial reforestation will be part of the work. The whole technical basis for the practice of forestry for the region will be covered, in addition to the problems of National Forest administration. Success in reforestation, timber growing, and protection will depend largely upon the technical knowledge obtainable by means of the newly established forest experiment station.

FOREST RECREATION DEPARTMENT

ARTHUR H. CARHART, EDITOR

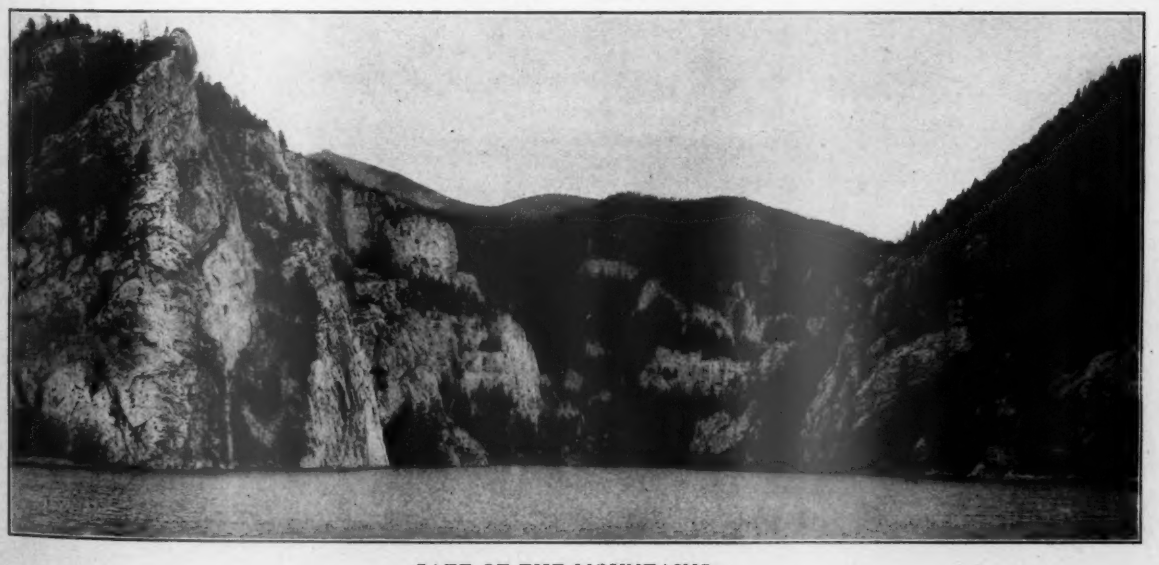
HELENA NATIONAL FOREST—A MOTORIST'S PLAYGROUND

BY A. H. ABBOTT, FOREST SUPERVISOR

MONTANA, the land of shining mountains, offers to the jaded citizen looking for restful vacation advantages unusual. Known and advertised for its mineral deposits, its livestock industry and farming opportunities and its magnificent stands of timber, the Treasure State offers also a wide range of lofty snow-capped peaks, waterfalls, tree-fringed lakes and trout-filled streams. These make up a vacation country of unusual charm and delights.

Many of these beauty spots are practically inaccessible except to the seasoned camper who can stand the vigorous exercise necessary to cover long trips on horseback. But there are people who for many reasons are unable to stand the rigors of such a trip, and these seek places where motor or carriage can take them in greater comfort and ease. All National Forests offer the chance to rough it, but there are a few which present to the visitor scenic values equal to others which can be also traveled in auto or buckboard. Such a Forest is the Helena National Forest, with headquarters at Helena, Montana. No more romantic land can be found if one is inclined to seek those places where history has been made. Every gulch, every town and each stream have tales to tell of the golden days of early mining activities. Many are old ghost cities now, but around the stark skeletons of mills and cabins hangs a glamor equal to the cloak of romance worn so readily and gracefully by the scenic settlements of the Old World. Helena, the capital city of Montana, is built in Last Chance Gulch. This name

Many of the playgrounds of America have been well known to the public for many years. The form of Old Faithful spouting in steamy grandeur at once suggests to all the great recreation grounds within the Yellowstone National Park. Many other cases could be cited where the scenic features of these areas are as well known to all. But one showing a picture of the Gate of the Mountains in the Helena National Forest would have to explain where and what it is. There are many little advertised but wonderfully beautiful scenic features in our National Forests and in them are many recreation fields of unbeatable offerings to the vacationist. It is somewhat with the same pleasure that you present a newly found friend to an old acquaintance that this department asks you to meet the Helena National Forest. It is deserving of your friendship and paying it a visit will prove this. Make this article your introduction to this Forest and an invitation to come and get personally acquainted with it.



GATE OF THE MOUNTAINS

Lewis and Clark paused here in their expedition of exploration to the northwest. Here the river cuts directly through the Big Belt mountains flowing through a canyon with sides of jagged rock partially cloaked with greenery of fir and spruce.

smacks of the olden days when prairie schooner bumped through rugged passes to reach the treasure of the western mountains. Many a pioneer had a last chance gulch, but this last chance proved to be a good one, and the early

BEAVER DAM
Under State protection these animals have increased from a point where they were almost extinct to where one traveling the highways of the Forest may often see their work.

working of the mines located here produced considerably more than $50,000,000 in gold. Now an auto road winds where before pack train and heavy wagon toiled to bring out the metal found in this canyon, and one of the most popular drives to be found in the section is through this famous mining location.

Confederate Gulch, another famous placer ground, heads in the Helena National Forest. There stands what is left of Diamond City, once the county seat of Meagher County, and a thriving town of several thousand people. Now, the miners have gone, most of the buildings are torn down, the Forest is gradually covering the great piles of earth and rock left from the placer washings, and the last resident, a Chinaman, China George, lives in his shack with only a cat for company, and dreams of the busy days of the past. These were indeed busy days, for during the mining here Confederate Gulch added to the gold supply of the world bullion worth from $70,000,000 to $100,000,000.

But these reminiscences of the gold rush days are not the only attractions which have a historical setting in the Helena Forest. Lewis and Clark paused here in their expedition of exploration to the Northwest. Standing today in all of the scenic beauty which caused these pioneer adventurers to give it so fitting a name, the Gate of the Mountains will prove to be one of the unusual attractions of the Helena. It is along the Missouri River, which has just reached lusty young riverhood at this point, and it is in the northwest corner of the Big Belt Division of the Forest. Here the river cuts directly through the Big Belt Mountains, flowing through a canyon with sides of jagged rock partially cloaked with the greenery of fir and spruce. The part of this canyon which constitutes the Gate of the Mountains furnishes one of the few water trips available in all Montana. The canyon is over twenty miles long, with walls rising over three thousand feet above water line. The entire trip to the Gate must be made by water and is a trip worth going miles to enjoy.

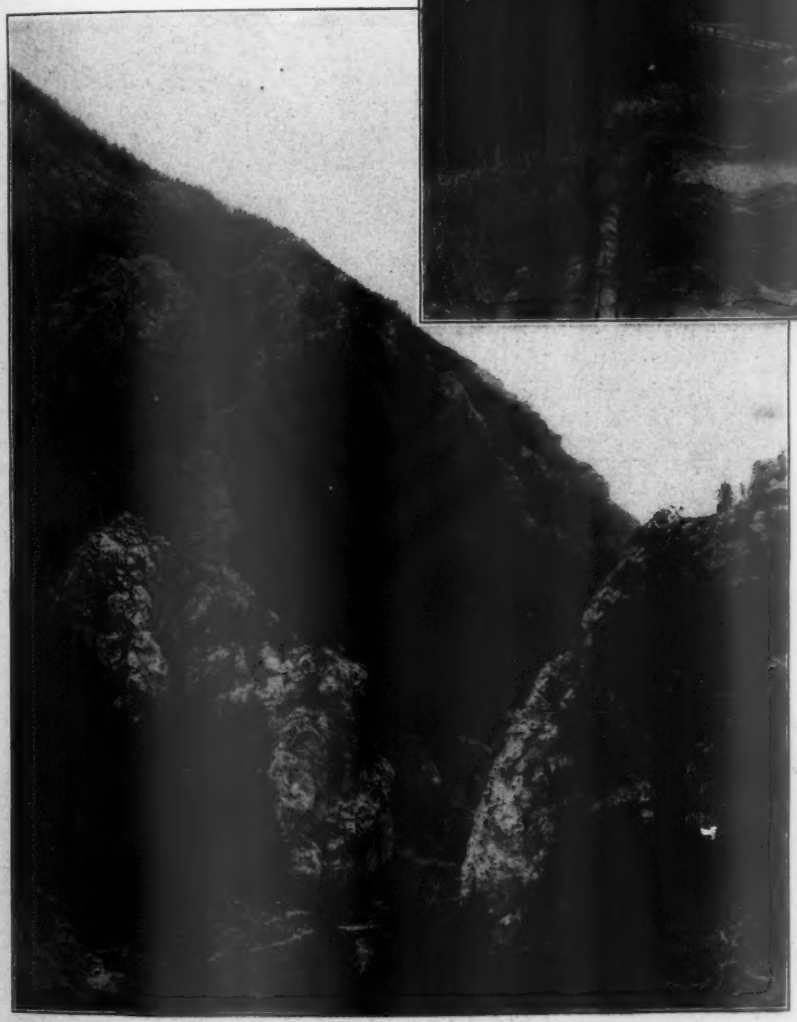
Following the McClellan road south from Helena one will soon reach the Forest. This is a good mountain road and for several miles its traverses pleasing picnic spots

LOCAL PEOPLE USE THE HELENA FOR PLAY
Fall, winter, spring and summer, the hardy Boy Scouts hike in the hills of the Helena. Signaling on a winter hike.

and camping places. Beyond the end of the road one reaches a country where foot trips and horseback travel must be resorted to. The road is typical of many in this Forest, taking one into the heart of the Forest as it does, and there allowing them to stop and explore the scenic features in a more leisurely fashion. Along the principal roads of the Forest and back where only pack horse can well travel are many open parks with nodding flowers and trees standing as stately guards around the borders. These are ideal locations for a camp or for a big community picnic. Along the road over Priest's Pass are many such places and

McCLELLAN ROAD

Following the road south from Helena, one will soon reach the forest. This is a good mountain road and for several miles it traverses pleasing picnic spots and camping places.



BEAVER CANYON

It is located in the Big Belt mountains and is near the Gate of the Mountains. The whole district is in a limestone area and wind and water have done master carving on these walls.

one right at the top of the pass and on the road was used by the citizens of Lewis and Clark County and their neighbors from Powell County for a picnic to celebrate the completion of another scenic highway in this National Foreground, the Priest's Pass Highway. In these forest parks one may camp for a night or a week or more, with only the rules of the forest governing when on Forest land. These are necessary to keep the camps fit places for all comers, and they are: "Keep your camp clean and leave it clean"; "bury or burn all refuse and tin cans"; and "as you value your life and property be

PRIEST'S PASS PARK

These are ideal locations for a camp or for a big community picnic. Many such parks can be found in this popular National Forest and they are freely used by the people of the vicinity.

careful with fire." Although most people do not stop to think of it there is no small penalty attached to violating these rules and if you are not careful your vacation may end in being invited before some court by a watchful ranger. This is true of all National Forests and of course applies to the Helena.

Many canyons of this Forest offer spectacular walls to view. The whole district is in a limestone area and wind and water have done master carving on these walls. Minaretted spires stand from the side and pinnacles with softest of colorings rise from abutments which reach into the valley floors, so that these spires and walls take on the splendor of the facades and towers of some magic city of the Orient.

Beaver Canyon is a splendid example of this nature carving of limestone cliffs. It is located in the Big Belt Mountains in the region of the Gate of the Mountains. A good road leads into this picturesque cleft in the hills and it is one of the favorite places where the people from Helena and other Montana towns go for a picnic on pleasant summer days.

There is a local appreciation of these play areas in

DIAMOND CITY

Once the county seat of Meagher County and a thriving town of several thousand people. Now—the last resident, a Chinaman, China George, lives in his shack with only a cat for company and dreams of the busy days of the past.

the Helena National Forest. Many of the residents of nearby towns take advantage of the chance to play in National Forest territory. The Y. M. C. A. has a camp in the Forest every summer and in the fall, winter, spring and summer the hardy Boy Scouts hike in the hills of the Helena.

Animal life is not wanting in this play land. All th usual wild residents of the hills are here from the more timid dwellers of the tree top and shrubby thickets to the larger game animals. Under the protection of the State the beaver have multiplied and have increased from a point where they were nearly extinct to where one traveling over a road which parallels a stream may often see their engineering feat of creating a lake for their own special benefit.

For the autoist traveling in the West the Helena National Forest is one place to be sought. Many National Forests offer a multitude of interesting features and pleasing places in which to camp or explore, but few offer the roads for the auto driver which one can find in the Helena. Then here, too, is the unusual trip which can be taken in a mountainous country through the canyon of the Missouri to the Gate of the Mountains, a bit of mountain scenery equal to many which are far more widely known, but no more unusual or interesting.

So wherever you travel in the West, whether it be in an auto with all the luxurious fittings of a parlor car, or if you drive a sputtering little four cylinder bundle of metal made active by the urge of gasoline exploding under a cracker box hood, make one of the objectives of your trip the Helena National Forest. And because it is impossible to here give more than a few representative things which you will find in this Scenic Forest you are invited to this place to find for yourself all of those unsung features which can be found here. The Supervisor's office is in Helena, and as you are bound to reach that point before you travel far in the Forest, you can there find information in full of the auto roads and scenic features of the playground for the motorist in the mountain lands of the Helena.

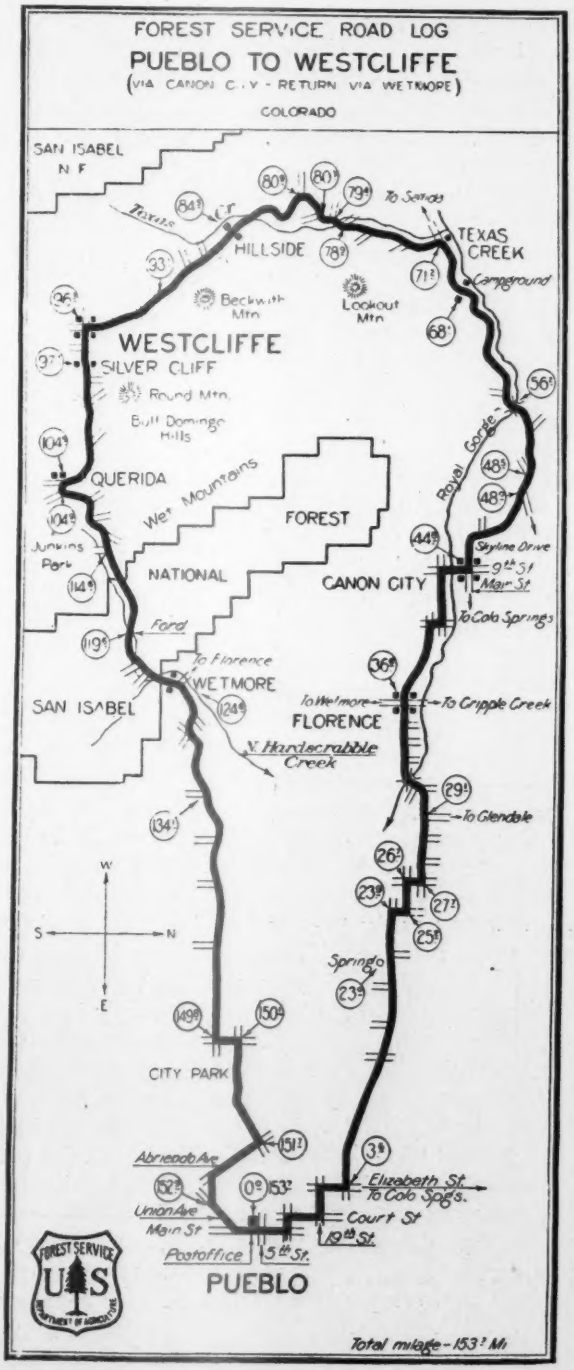
FOREST ROAD LOGS IN COLORADO

The illustration shows a typical road log of a new series that is being prepared by the U. S. Forest service, cooperating with local commercial organizations. Practically every road in mountainous country of Colorado either passes through or near National Forest territory. It is probable that eventually every road so situated will be logged and cards printed similar to the cut shown. Armed with a sheaf of cards the tourist will be able to explore the mountains from end to end for one card fits to another to give the log of a trip of many miles or serves as a single trip log. These may be secured from the local commerce clubs of towns in and near the mountains of Colorado.

THE WOODBURY WEEPING ELM

A few miles out of Union City, Indiana, stands a noble old tree of the weeping elm variety, or as botanists would say—water elm.

The great tree is isolated from others of its kind, and for this reason is a conspicuous landmark. It has a place in all the guide books that are compiled for the benefit of travelers. The height of the tree is much over 100 feet; the trunk, 4 feet in diameter; the spread of the graceful, drooping branches, 100 feet; the age, estimated to be near 200 years. The first owner of the farm was Nathan Woodbury.—*V. M. Overman.*



WE FAIL TO USE FOREST-GROWING LAND

REFORESTATION has not been taken seriously by the average business man in the United States," said Col. W. B. Greeley, chief of the Forest Service, United States Department of Agriculture, before the National Association of Wood Turners recently. "Reforestation has been looked upon as a fad quite removed from the practical interests of the manufacturer, as something more concerned with parks or shade trees or rose bushes.

"Chicago is the greatest lumber market in the world. Since 1890 an average of over 2,000,000,000 feet of lumber has come into Chicago every year. In 1920 the figure was nearly 2,500,000,000 feet, 60 per cent of which went into local construction and manufacturing industries. In 1900 the average freight paid on lumber coming into Chicago was less than $3 per M feet. Since that time the local sources of supply for this territory have been exhausted one after another. Lumber shipments have traversed greater and greater distances, and the average freight bill paid by the Chicago distributor has steadily risen to more than $12 per M feet.

"In other words, the increased transportation charge on lumber shipments into Chicago, as a result of the exhaustion of the forest regions surrounding it, represents a toll of $22,500,000 annually. And while this has happened there have accumulated in the Central and Lake States nearly 23,000,000 acres of logged-off forest land which is producing neither farm crops nor timber; $22,500,000 is the yearly tax which the wood-using industries and home builders, supplied through Chicago, pay for the idleness of a large part of the soil in the surrounding States which should furnish the natural supply for this district. This sum would plant every year 1,500,000 acres of land with forest trees.

"This illustration may be extended to cover the four States of Illinois, Indiana, Wisconsin and Michigan. These States consume annually between 4,000,000,000 and 5,000,000,000 feet of timber in furniture factories, sash and door mills, factories manufacturing agricultural implements, wood-turning establishments and other wood-using industries. Sawmills are excluded from this estimate, also the requirements for general construction and housing, and the consumption of lumber on farms. The manufacturers referred to represent an invested capital of $760,000,000 and enroll 260,000 skilled employees. This great manufacturing industry was built up on the softwood forest of the Lake States and the hardwood forests of the Ohio and upper Mississippi valleys, whose products were available at a low transportation cost. In these four States enough forest land to supply in full the needs of these industries now stands idle.

'We are cutting our timber probably four times as fast as timber is being grown. It is useless to decry the generous use which American industry has made of our forests. It has contributed powerfully to the industrial development and commercial supremacy of the United States. The forestry problem does not result from the liberal use of our forests, but from our failure to use our forest-growing land. There is an ample area of land in this country, which is not tillable, to support all of our timber requirements, all of our wood manufactures, all of our home building and agricultural use of lumber, indeed an even larger export trade than at present, if that land can be kept at work growing timber. Reforestation has become a commercial necessity of the United States."

STATES AIDED IN FOREST PROTECTION

Twenty-four States, or more, will receive $400,000 of Federal funds for the protection of their forest lands from fires during the fiscal year beginning July 1, according to statements by the Forest Service of the United States Department of Agriculture. This co-operation was first authorized by the Act of March 1, 1911, commonly known as the "Weeks Law," and has continued ever since. Last year $125,000 was appropriated for the work, but Congress this year, realizing the importance of fire prevention in our forests, substantially increased the amount to be expended. At least three more States are expected to join the ranks of co-operators shortly.

Allotments of money for forest protection are made by the Forest Service to individual States on the basis of 7 per cent of the estimated cost of adequate fire protection in that particular State, with the limitation that the maximum allotment cannot exceed $25,000. Both figures depend upon, and vary with, the size of the Federal appropriation for this work received from year to year. Forestry experts believe that the ideal apportionment of protection expense would be: Federal Government 25 per cent; States 25 per cent; private owners 50 per cent, but this is not possible at present.

The four important limitations governing Federal co-operation in fire protection under the Weeks Law are:

(1) It is extended only to States that have provided by law for a comprehensive system of fire protection.

(2) It is limited to the watersheds of navigable streams.

(3) The State must expend an amount at least equal to the Federal appropriations for that State.

(4) Fire protection must include not only merchantable timber, but also young growth and cut-over lands; in other words, it must cover all classes of forest land.

The basis of this Federal co-operation is the recognition by the Government of the Nation's interest in keeping the forest lands of our country continuously productive, especially on the watersheds of navigable streams and the further recognition of the fact that the Nation should bear a part of cost of the work.

FIGHTING THE JAPANESE BEETLE

BY C. H. THOMAS

AT Riverton, New Jersey, an entomological laboratory has been established, with a corps of thirty or more men, mostly college students, from the various state universities, and elsewhere, whose purpose is the study and control, under efficient government supervision, of the Japanese beetle. This destructive beetle has been found in large numbers in Burlington and Camden Counties, where it attacks the flowers, shrubs, nursery stock, vegetables, corn and a great variety of marketable produce. That the beetle is a real menace to other sections of the country has been proven by its ravages in the territory where it is now confined, and every effort is being made by the men who are studying its life habits to control the troublesome pest. The beetle attacks the foliage and injures by skeletonizing the leaves, also by attacking flowers and actually eating fruit on the trees.

The Japanese beetle is a beautiful insect about the size of the potato beetle, but flattened. The head and thorax are shining bronze green and the elytra or wing covers are brownish tinged with green to the edges. On the sides and at the tip of the abdomen, usually not concealed by the wing covers, are conspicuous white spots, which distinguish the species from all others of the same size and habits occurring in New Jersey. It was first discovered in 1916, having been brought from Japan, apparently. In some parts 20,000 of these beetles have been collected in a single day. The spread of the insect is over an acreage of about 5,000 acres of the finest kind of soil.

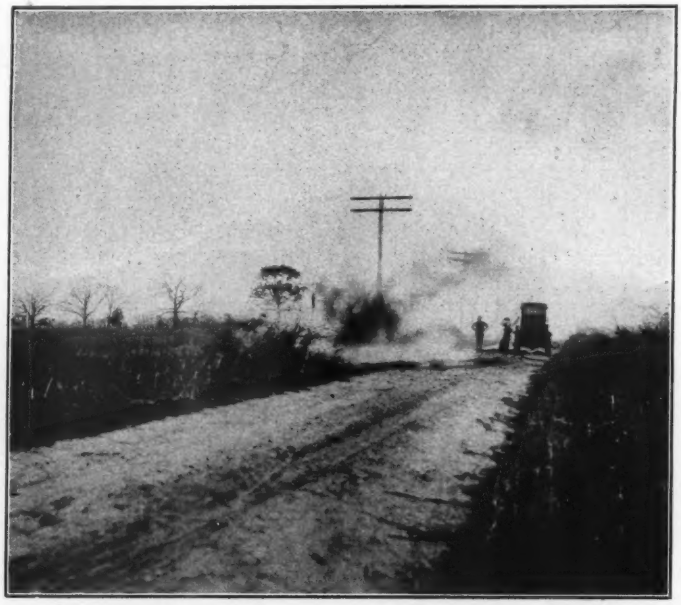
JAPANESE BEETLES DESTROYING PEACHES

Though the beetle seems to prefer a diet of developing roots and compost of all kinds, it is as well a voracious feeder on the choicest fruit, as shown in the photograph.

The fight against the beetle is being waged by using all sorts of preventive measures, including the use of arsenate in solution as a spray. From June 15th to November 1st the Federal and State plant quarantine laws require farm, garden and orchard products, plants and flowers, grain and forage crops of all kinds, and soil from the infested area to be certified as free from the Japanese beetle before shipment is permitted. Farms within the quarantined area, but outside the known infested territory, are granted certificates permitting shipments until beetles are found and the permit revoked. The men are assigned each day to certain farms, where they officially inspect all produce to be sent to the markets, and a certificate is not issued until the stuff is known to be as nearly free from the beetles as is humanly possible to determine by a careful inspection. The beetle lives in the ground a great deal of the time, coming up and finding refuge along the roadsides, whence it may be carried in a passing vehicle or on personal clothing to a point outside the infected area, which more than likely explains the way it got over into Pennsylvania, where it is at present causing considerable alarm, although scouts are now working vigorously to offset the pest in its new habitat. The State Department of Agriculture is opening a field headquarters in Holmesburg, Pennsylvania, from which it will direct the fight against the Japanese beetle. The beetle invaded Pennsylvania late in the fall from the New Jersey side. A quarantine had been imposed by the department upon agricultural products in the infested area, which takes in the small strip of farming country in Philadelphia county and part of Bensalem township, Bucks county. Details of the proposed fight to eradicate the pest from Pennsylvania were formulated at a conference held in Philadelphia by Prof. J. G. Sanders, head of the Bureau of Plant Industry, State Department of Agriculture, and C. H. Hadley, of the federal Department of Agriculture. A representative of the Pennsylvania Department will be in charge of the field station, and a set of maps will be made showing the location of each tract of land in the infested area. Federal inspectors will be appointed as deputies of the Pennsylvania Department so as to facilitate the examination of intrastate shipments from the quarantined district as well as interstate shipments. The Japanese beetle is a strong flier and capable of dispersing itself over considerable distances, but the greatest danger lies in the ease with which it may be carried in vehicles or on clothing. To offset this the shrubbery is burned close to the road and a good ways

back, so that the beetle is confined to the ground and can be thus taken care of better in the ground by spraying with poison.

The beetle larvae seems to prefer a diet of decomposing roots and compost of all kinds. They have, however, been observed feeding on the roots of dock, plaintain, timothy, bluegrass, corn, rye, wheat, clover, dandelion, willow, violet, elder and azalea. The beetle is very prolific and the total life cycle of the insect is one year most of which time is spent in the soil as egg, grub or pupa. They are omnivorous, resistant to unfavorable conditions, strong fliers and very active during warm, clear days. They choose grassy or weedy ground, unshaded by thickets or trees, in which to lay their eggs and prefer moist, loamy soil to dry, sandy soil or swampy areas. In fighting this beetle, great areas have been thoroughly gone over, brush and weeds destroyed and burned and the soil in sections heavily infested sprayed with sodium cyanide to destroy the grubs. Erroneous statements have been published to the effect that the ravages of the beetle were so bad in Nw Jersey that practically everything was being destroyed by them and made unfit for use, and farmers in other parts of the country who desired to buy plants from this locality were dissuaded from doing so by these reports, which were not altogether true and somewhat farfetched. But the fact remains that they have attacked growing apples and trees, rendering the fruit unfit for market, have caused destruction to certain shade trees and injured such crops as field corn by cutting the green silk and thus preventing fertilization of the grain.



WORKING TO CONTROL THE JAPANESE BEETLE

In order to prevent the insects being carried in vehicles or on clothing, the shrubbery is cut close to the ground and then burned well back from the roadside in heavily infested areas.

Future plans to prevent the spread of the insect have been worked out as follows:

By scouting, to establish as far as possible a limit to infestation.

By establishing a barrier.

By treating roadsides in such a way as to minimize the chances of the beetles getting out of the area.

By killing the grubs in the ground by the use of cyanide in solution.

No absolutely effective poison has been found which will kill the beetle, because those so far tested, either ruin the plant foliage, are ineffective poisons, or the beetle is repelled by the poison. Thus the beetle has so far proven somewhat immune to these usual deadly and effective agents, so the fight now being waged against the beetle is of great economic value. The beetle has been fairly well confined to the section where found and while some few beetles have been found on the Pennsylvania side of the river effective measures have been put forth to combat their further destructiveness. A campaign of education will have to be waged, in order to get everybody aroused and interested in the true nature of this Japanese Beetle, which has done and can do untold damage. More than $100,000 has already been spent on the life, study, habits and inspection work, and other propaganda relating to the beetle, and by applied work of these thoroughly interested investigators, its ravages have been checked and its nature better understood. The farmers are, as a rule, very enthusiastic in giving every assistance possible to these men, in order to try and rid their farms of the beetle. As this section of New Jersey is one of the richest sections of the United States for the growing of market produce, efficient daily inspection of marketable produce, it is hoped, insures the pest being confined and ultimately wiped out. The young men who worked at Riverton during the past summer all were men who were fully interested in this work, and met with the finest kind of cooperation every day. They lived in tents along the river and here conducted valuable experiments which will mean much to this or any other area similarly affected.

IN 1911 Supervisor Grandjean procured seed of the big trees (*sequoia Washingtoniana*) from San Francisco. He planted these in the Forest nursery and in a couple of years transplanted them on his lots in Boise. Both of the trees are alive and doing well. The larger is approximately twenty feet in height and nine inches in diameter at stump height.—(*Daily News, Intermountain District.*)

YOU can't start forests from stumps, any more than you can start wheat from stubble. If we are to have timber in the future, we must grow it as systematically as any other crop.

THE man who is impatient, and will only attempt what he can see bear fruit, in a very short time will only grow success of the pumpkin and squash variety. It takes years to grow an oak tree."

INSECTS AND SPIDERS

BY DR. R. W. SHUFELDT

(Photographs from life by the author).

IT is the usual impression among those who have paid but scant attention to anything bordering on Nature Study in general, that the spiders and insects of the world all belong in the same assemblage, and that they may be referred to, as a whole, as insects—such as beetles, bees, and butterflies. This is quite wide of the mark, and it is the object of the present article to throw a little light on the question.

Spiders, for instance, have eight legs; all the insects so-called, have six. Spiders have no antennae and no wings. Spiders have one pair of jaws, the insects have two.

The centipedes, "thousand legs" and their near allies, are insects and not spiders.

We have some very remarkable spiders in the United States and many of them are very well known. For instance, the common yellow and black "garden spider" is familiar to nearly every one, and four examples of them are here shown in Figure 2, they being the larger ones in the cut. In summer, many of these are found in old fields where goldenrod and dogbane grow, and where the grass and other vegetation is coarse and rank. They construct a beautiful "orb-web"—a structure that may frequently be seen in city and country gardens, however small the first-named may be.

Our biggest spider is the Texas Tarantula; and unless one has especially looked the matter up, few there are that could guess how the spiders called tarantulas ever had had such a name bestowed upon them; least of all would it be suspected that the name was derived from a *dance*.

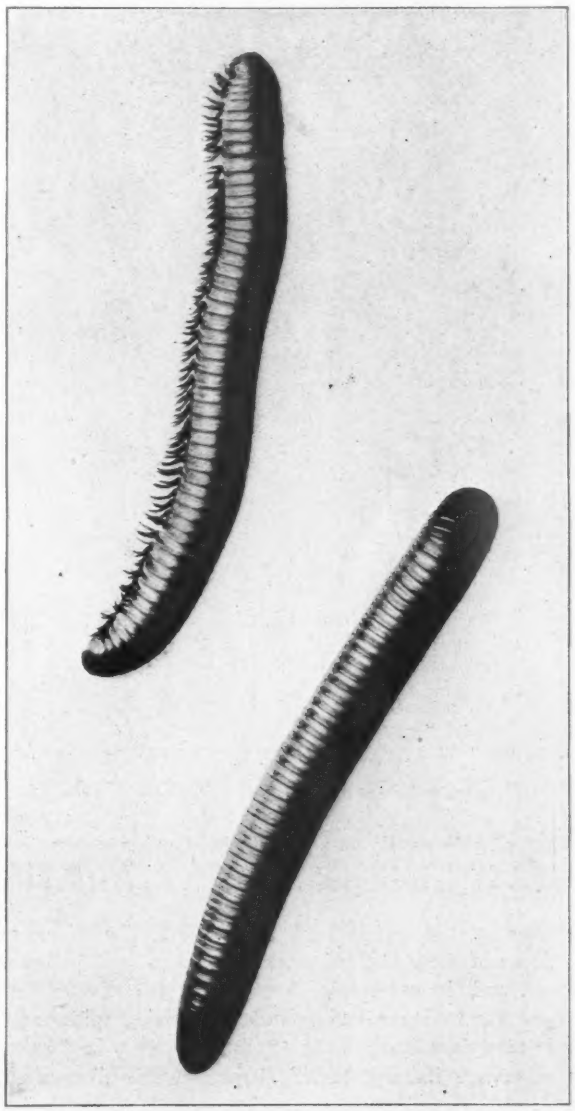


FIG. 1 A PAIR OF LARGE MILLIPEDS FROM FLORIDA

This insect is of a beautiful chocolate brown color, being more lightly tinted at the joints. It can curl itself up in a circular manner like its little relative of the north.

Now, many years ago, a certain class of Italians greatly feared the bite of one of these venomous spiders, and, swayed by the superstitions of the time, they inaugurated a dance at the city of Taranto, in southern Italy, to which they gave the name of "tarantella." Only a single couple performed it, one or both of whom had been bitten by a tarantula. So maniacal was this dance in its whirling and giddy figures that it was regarded as a mania to which the name of "tarantism" was given. After a while it came to pass that one had but to suspect that he or she had been bitten by a tarantula in order to at once find a partner, and then and there commence to dance the tarantella or tarantelle, as it was also called. This was along in the sixteenth century, at a time when many believed that the tarantella was an absolutely certain cure for tarantula bite. As time passed, the nature of the dance underwent a very considerable change, as it began to be accompanied by music of a peculiar, rapid rhythm, and *six* couples took part in the dance, which had lost none of its insane, whirling character.

The name tarantula is also applied to a certain fish and to a lizard, while in southern Europe it only suggests the big *wolf spider*.

There are many species of tarantulas described, and a large number of them occur in the Americas. The one here figured is from Texas, and the writer had it alive for some time. Not only is it one of the largest spiders known, but a most dangerous and vicious creature. It was not an easy subject to photograph, as it had a way of jumping some

five or six inches, when least expected—evidently with the intention of inflicting a bite. From tip to tip of its outstretched longest pair of legs it measured a little over six inches. Most of the tarantulas are hairy species, and hardly to be considered in any way handsome or otherwise attractive—even by a naturalist.

These big spiders, also known as "crab spiders," frequently catch small birds, especially humming birds, and feed upon them. On the other hand, however, a great wasp is found in the regions where they occur, which has been called a "tarantula killer" on account of its habits, as it habitually hunts for them, stings and paralyzes them when found, and then deposits the helpless victim in its burrow, lays an egg there, from which, in time, emerges a larval wasp, to find a tarantula feast already set forth, upon which it at once proceeds to dine. Occasionally one may come across a tarantulated hummer or other small bird. should one be so fortunate as to meet with the same at about the time it had been attacked and bitten by a tarantula. However, such occurrences must be rare. Many are of the opinion that no ill effects follow upon the bite of a tarantula, beyond such symptoms as usually supervene after the bite of any animal suspected of being venomous. However this may be, the writer has reason to believe that the bite of one of these big, hairy fellows is more or less poisonous, and, in some cases, highly dangerous. There is also a scorpion called a tarantula, for the reason that it resembles one of the latter in general appearance; otherwise its tarantular characteristics are but imaginary.

Closely related to the true tarantulas are the "trap-door" spiders that build very remarkable nests, with a neat, close-fitting trap-door to them; but, upon the other hand, all true tarantulas burrow in the ground, or construct a regular nest resembling a small bird's nest, or they may simply live under stones or under the bark of trees.

Although by no means a rare species in most of the Southern States, the Silk Spider, the scientific name for which is *Nephila clavipes,* is interesting for all that. During last summer (1920), Mr. R. H. Young, of Bradentown, Florida, sent the writer a fine, living specimen of one of these spiders, and an excellent photograph was at once secured of it, giving it natural size; this illustrates the present article.

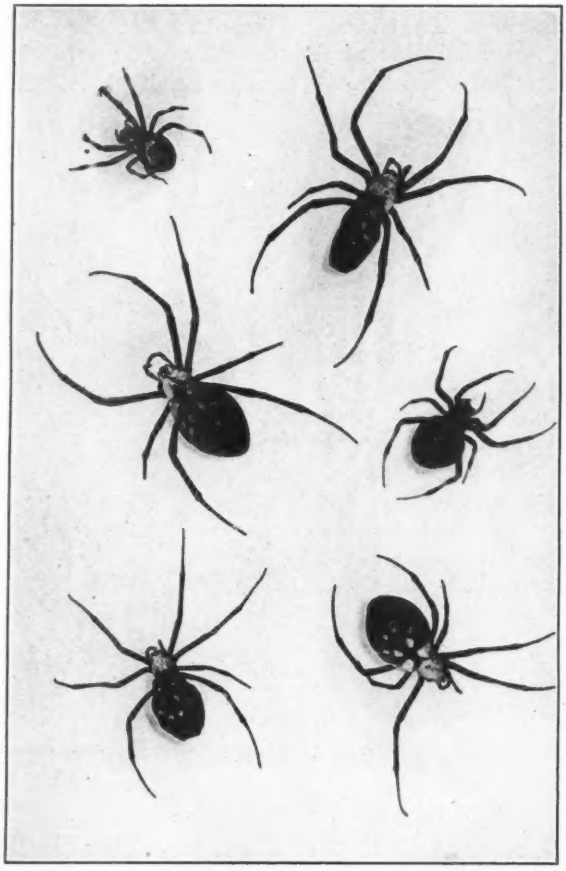


FIG 2. FOUR LARGE GARDEN SPIDERS WITH TWO OTHERS

Garden Spiders vary not a little in form and markings, due to sex and age. They build a beautiful orb web, capturing and devouring many grass-hoppers in the course of a season

In the cut we may note the curious tufts of hairs at the flexures of the eight long legs, and the elongate abdomen with its pretty double row of dots. The rest of the body is white with a pair of tiny black spots, which look for all the world like the creature's eyes. At the time of its capture, Mr. Young noted that it possessed a sort of chameleonic power, its body —that is, its abdomen— changing from one shade of brown to another, being for a moment a dark umber, passing to a light ochre, and back to brown again. This the writer was able to verify after it came to hand.

Nephila spins a beautiful web, as do its relatives in the tropics, where numerous of these species occur.

The study of spiders is a wide field, as thousands of species have already been described, and we have not a few popular and beautifully illustrated books on the subject. As stated above they differ from insects, one difference being that spiders possess four pairs of legs (coming from the thorax), while true insects have but three pairs. The spiders are related to the true scorpions, to the mites, and to others, and they breathe by lungs and tracheae. For example, so necessary is air to them that the diving spider sees to it that it exists in its sub-aquatic home. It "weaves itself a curious little bell-shaped dwelling," says a popular writer, "at the bottom of the water, to which it retires to devour its prey. As, notwithstanding its aquatic habits, this animal, like the rest of its class, is fitted only for aerial respiration, it takes care to fill its miniature dome with air, which it carries down with it from the surface, among the hairs with which its body is thickly clothed."

Then, other spiders, as well as some of their close allies, are more or less dangerous to man, as the dreaded tarantulas and the scorpions. Anatomically, they are remarkable; while their relatives, the *mites,* possess but one ganglion in the body, and utterly lack a heart, a

brain, and a windpipe! Their mouth-parts are wholly rudimentary. True spiders have a liver, which no insect with wings is known to have.

A few years ago, the writer photographed a tarantula—one of the giants among spiders—that was seven inches across, measured on its extended legs. Relatives of this dangerous fellow in South America and Mexico often prey upon humming-birds, which, it is said, they climb trees to capture.

Others of our spiders weave a beautiful silken sphere about their eggs, carrying it about until the young hatch out; and the achievements of the trap-door spiders are well known to many. Elegant webs are woven by some species, and many forms are brilliantly colored, being figured and spotted in a way most bizarre.

We have in the United States a long list of those insects we usually designate as beetles. There are some fifteen thousand different kinds of them, and they range in size all the way from little bits of ones that it almost requires the use of a microscope to see, to such giants as the Spotted Horn Beetle shown in Fig. 5 of the accompanying cut.

Some of our beetles are of a very plain color—often a dead black or lustreless brown, while others reflect all the prismatic colors of the rainbow. During the summer of 1920, the United States National Museum kindly loaned the writer over twenty of the commonest forms of American beetles; a dozen of these he photographed, and a reproduction of this illustrates the present article. All of the beetles thus shown are abundant species in one part of the country or another, and all of them present interesting life histories. Many of the readers of AMERICAN FORESTRY will recognize some of them on sight; a few will know all of them, while several of the forms figured in it will be of value to foresters to know, as they have to do with the welfare of, or are more or less injurious to, some of the trees of our forests or to our shade and fruit trees.

FIG. 4. A CURIOUS SPIDER FROM FLORIDA

This specimen was captured and presented by Mr. R. H. Young, of Bradentown, Florida, and the reader is invited to note the peculiar hairy tufts between the leg-joints.

When fully adult, an ordinary beetle may be recognized through its having its front or superficial wings hard and stiff, and much thicker than the semi-transparent ones they cover. These hardened wings meet down the middle line of the body by contact of their inner borders—they are called the *elytra*, and their line of contact the *suture*. In a few groups, these elytra do not cover the abdomen posteriorly; but this is not the case with any of the beetles here shown.

Larvae of beetles possess no legs on the abdomen, with the exception of the last joint, where it is not uncommon to find a pair. In the adults, the mouth-parts are constructed for chewing. Running beetles are wingless, as a rule, the exceptions being where these structures are present but fused together at the suture.

"Grubs" are the larval forms of beetles. Most, if not all grubs, possess three pairs of jointed legs on the thorax. Among the larvae of the "snout-beetles" we find no jointed legs present whatever, and a study of their structure is a very interesting subject, not to say an important one.

With the exception of the Spotted Horn Beetle (No. 5), the writer has collected in nature all of the beetles shown in the cut—some of them many times, and made notes on the habits of each. The only Spotted Horn Beetle he observed alive was in New Orleans early in the eighties. It flew into a room of his quarters at Jackson Barracks; and, as it struck the wall and fell to the floor it sounded as though someone had fired a stone at the occupant. As the room was dark—the lamp having been extinguished—the beetle almost immediately took to flight again, making its escape through the open door. Lutz says of it that "The common name, Unicorn Beetle, is scarcely correct, for the males have three horns on the pronotum, the ones on the sides curved and very short, the median one with yellowish hair beneath notched at the tip, and projecting forward to meet a long, curved horn arising from the head. The females have only a

slight tubercle on the middle of the head. It is a southern insect, rarely seen even in southern New Jersey, for example; I have found larvae, pupae, and adults abundant in rotten wood in southern Mississippi." It is the largest of all North American beetles, and gives forth a very disagreeable odor when handled. Young beetles of this species, directly after passing from the pupa stage, are of a rich brown color; but as they become adult, they gradually change to a beautiful gray on the wings, sometimes verging on a deep orange on the head. The elytra, as seen in the cut, is irregularly spotted with black spots of various sizes and shapes. In some specimens the ground color is of a greenish gray. Sometimes, in collections, specimens of this beetle have a way of turning entirely black — first one side of the body and then the other. West Indian Hercules beetles also belong to this group, and they are the largest of all known existing species; it is said that the horn on this beetle's head is at least three or more inches long.

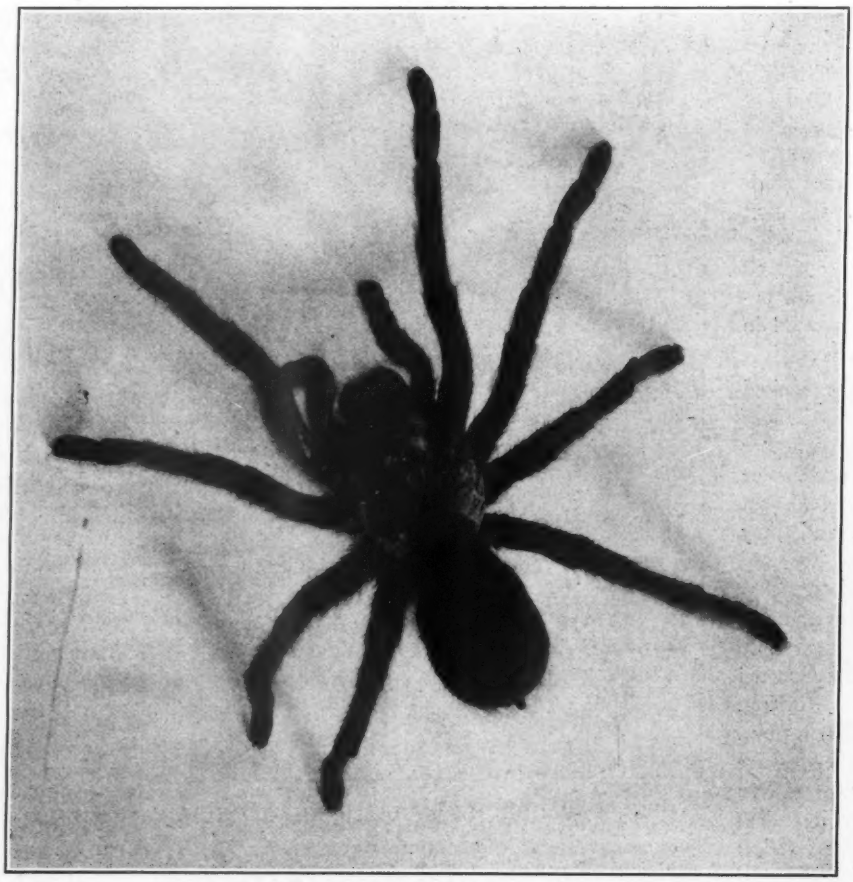


FIG. 3. A LARGE TEXAN TARANTULA

The bite of this species is dangerous and they have the habit of suddenly jumping when near the object they attack, either in an offensive way or to capture their prey.

While living in southern Connecticut, the writer frequently captured specimens of the Cloaked Knotty-horn; they were always found on elder-berry bushes. It is known that the larvae enter the pith of that shrub, and that the beetles appear during midsummer. They are rare in the District of Columbia, the writer having captured only a single specimen after hunting for it during several summers. It is a very beautiful insect, the head and hinder halves of the wings being of an intense blue, the rest a rich orange. This latter character accounts for one of its common names, as it has the appearance of having a little cloak thrown over its shoulders. It is also called knotty-horn, and the structure of its antennae will account for this (No. 1.)

Down in South America they have some elegant insects which they call Buprestids, while those we have are rather modest little species, such as the Virginia Buprestid, shown in No. 2, it being one of the largest species of the genus in the United States. A Maryland specimen taken by the writer had a length of one and a quarter inches; it was of a brownish black color, slightly bronzed, with darker markings. These insects are wood borers, attacking pines, and, consequently, harmful to those trees, and sometimes the damage they do is very extensive. One can readily recognize it by its rough and ridged elytra.

Mahogany brown in color, with the under parts much lighter, the Straight-bodied Prionus is well named, as the sides of the elytra are nearly parallel for their entire lengths (No. 3). Note the spines on the sides of its neck—they assist in identification. It seems that there are no reports published charging this insect with doing damage to our forest trees. Sometimes the larvae are found in hundreds in dying hemlocks, where they were not concerned in the killing of the trees; they also occur in rotten pine stumps. Packard gives us an excellent cut of this beetle in his "Forest Insects," and says of it that "Mr. Calder has also found the fully-grown larvae in August in maple logs at Warwick, R. I., and in the rotten wood of another deciduous tree. So that it appears that this beetle lives indifferently in the soft, decayed logs or stumps both of hard and coniferous trees."

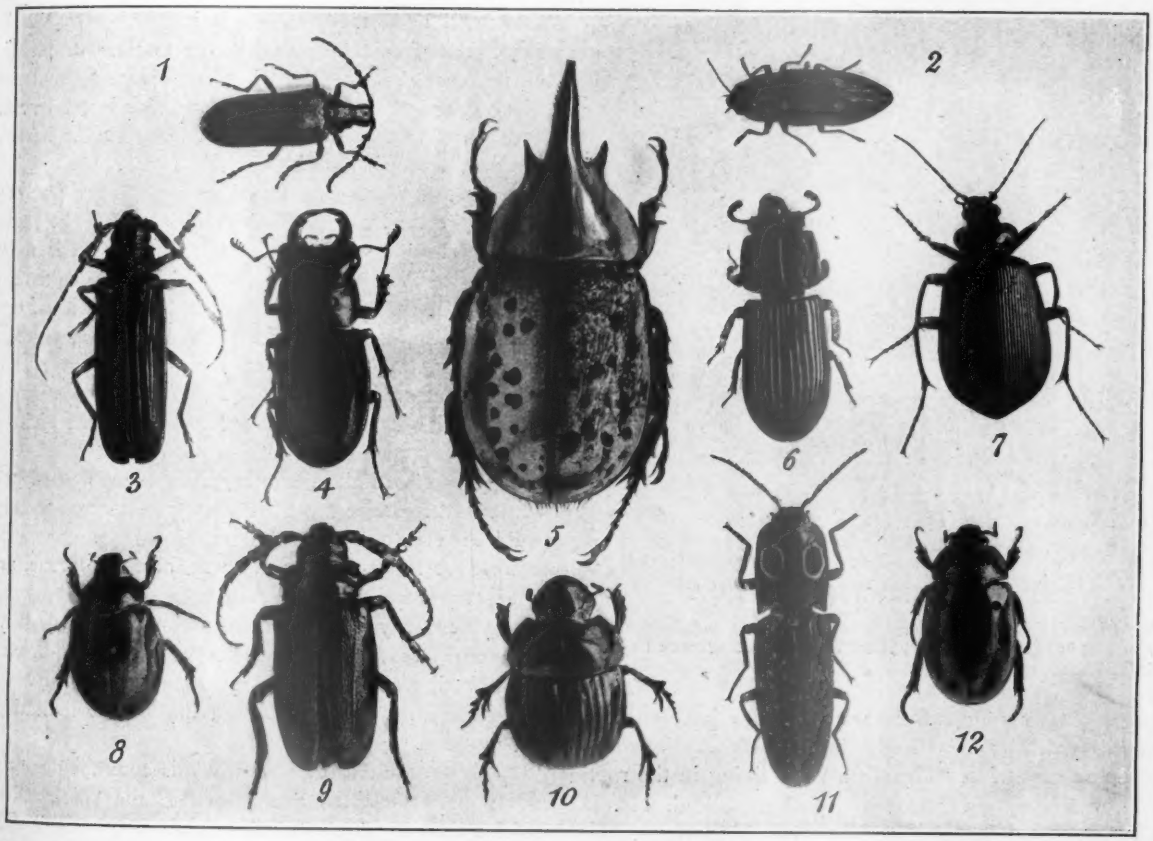
Stag beetles of the species shown in No. 4 are of a very dark brown color, and get their name from their big mandibles or jaws, which resemble miniature antlers of a stag or deer; these are shorter in the female insect.

One may meet with the plump, yellowish-white larvae in rotten oak and apple stumps, and in some others. Dr. Lutz says this beetle is very abundant near New York.

A related form of the Stag beetle is the Horned Passalus (No. 6), a very abundant species in the District of Columbia. The writer has generally found them under the bark of fallen and decaying pine and oak trees. Sometimes as many as twenty or thirty beetles occur under a piece of bark not over a foot and a half square. They have sharp little median horns projecting forwards on their heads; are almost black, and very glossy—indeed, one may say they are quite handsome creatures. When disturbed they rub their hard, outer wings together, and thus give forth a peculiar, hissing sound; so should one have a dozen or more of them in a dry box, their concert may be heard across an average-sized room. Some country people call this beetle the Horn bug.

The Searcher (No. 7) is one of the most beautiful of all United States beetles, its hard and somewhat rough elytra shows a great play of color when held in different lights. At one angle it appears to be of a rich azure, and, turning it various ways, this passes to gold, or red, and then to brilliant green and violet. It is a most beneficial insect in our forests, as it hunts and devours no end of caterpillar pests; indeed, the country folk call it the Caterpillar Hunter, and are more or less familiar with its habits. In nature we find them under stones and sometimes old logs. Occasionally they fly about the city street-lights. So industrious are they in their hunts for canker-worms and caterpillars that they will climb up trees for them, and devour them as they are in the act of destroying the leaves or fruit. One kind of caterpillar preys on the leaves of the oak trees in the West, and this pest is destroyed by the hundreds by this handsome beetle. Miss Emma A. Smith gives a fine account of this in the January 9 issue of the *Prairie Farmer* (1878).

Another very handsome insect is the Goldsmith Beetle (No. 8), a superb and not abundant species that looks as though it were made of solid gold, it having a coppery-



A VARIETY OF BEETLES

Fig. 5. The species of beetles here figured, natural size, are described in the article; so, for the reader's convenience, it will only be necessary to give a list of them here:

1. Cloaked Knotty Horn (Desmocereus pallictus).
2. Virginia Buprestid (Chalcophoca virginica).
3. Straight-bodied Prionus (Othosoma brunneum).
4. Common Stag Beetle (Lucanus dama).
5. Spotted Horn Beetle (Dynastes tityrus).
6. Horned Passalus (Passalus cornutus).
7. The Searcher (Calosoma scrutator).
8. Goldsmith Beetle (Cotalpa lanigera).
9. Broad-necked Prionus (Prionus laticollis).
10. Tumble-bug (Copris carolina).
11. Eyed Elator (Alaus oculatus).
12. Spotted Pelidnota (Pelidnota punctata).

greenish hue beneath. It feeds on the leaves of various trees, being especially harmful to pear trees, and in a less degree to oaks, elms, hickories, and other kinds. This form gets its scientific name from the fact that the under side of its body has a "wooly" covering, and it seems to occur in greater numbers in New England. Many life histories of the Goldsmith beetle have been published, and a long and interesting account of it will be found in Packard's "Insects Injurious to Forest and Shade Trees" (pp. 274-276). This valuable work for foresters was published by the U. S. Department of Agriculture in 1890, and may be found in many general libraries.

In the work just cited, we also find an admirable and illustrated account of the Broad-necked Prionus (No. 9).

FIG. 6. POTTER-WASP AND NEST

This insect is by no means an abundant one, while perfect specimens of the little pot it makes are rather rare objects in museum collections.

and a year or more ago the present writer gave an illustrated sketch of this beetle in AMERICAN FORESTRY. Packard says of it, "Though usually living in the roots and trunks of the poplar and balm-of-Gilead, Mr. F. Clarkson states that at Oak Hill, Columbia County, New York, this borer infests the black oak, the beetle emerging at twilight during the first two weeks in July." He figures both the pupa and the larva.

Tumble-bugs are among the most remarkable insects that we have (No. 10), and the habits of many of them are very extraordinary. One United States species is very brilliantly colored. They are also called "dung beetles," for the male and female will roll up a ball of dung—cow dung—considerably bigger than either one of them, and tumble it over and over down a dusty country road in a way most remarkable to behold. At the end of such a long journey, the female lays her eggs in this ball, and then *buries* it. The tumble-bug here shown is a male, and so exhibits the "horn" on its forehead—a character scarcely developed in the female. Life histories of tumble-bugs in various parts of the world are wonderfully interesting. Professor Comstock, of Cornell University, in writing of them said that "this is one of the instances, rare among insects, where the male realizes that he has some responsibility as a father, and assists the female in providing for the young." To this order belong the Scarabs, a tumble-bug held to be sacred by the ancient Egyptians (*Scarabæus sacer*).

A most striking beetle is the big, gray and speckled Eyed Elater, shown in No. 11, with the pair of elliptical black eyes on its thorax. This is one of the "clicker beetles," and during some summers we may meet with several of them. However, the writer has never found them to be over-abundant, having discovered, perhaps, up to date, a dozen or more. Its larvae occur in decayed trunks; and upon the whole, this interesting species is not considered especially destructive to trees or plants. Old, rotten apple-tree trunks is a good place to hunt for its larvae, and the beetle preys upon other insect larvae. More than 500 different species of these clicker beetles occur in the North American insect fauna.

Among the grape-vines in midsummer is the place to look for the beautiful Spotted Pelidnota (No. 12), and many people are very familiar with it. It feeds upon the leaves of the grape, both the wild and the cultivated kinds; but it does little or no harm, and is, withal, one of our handsomest beetles. Beneath, it is bronzy-green, and a shiny, tan-brown above, being spotted as shown in the accompanying illustration. Most often the writer has found its larva in old, dead stumps of the hickory and different species of oak.

Many species of beetles other than those figured and mentioned here have most interesting histories, and they would appeal to those foresters who investigate such matters. A large number of them, or their larvae, are dangerous enemies of our shade or forest trees, and among them may be mentioned the Sawyer that destroys evergreen trees; various species of the Snout-beetles, and, indeed, a perfect host of others, a mere list of which would carry this brief article far beyond the limitations of our space.

Of all the families of wasps in this country, none can exceed in interest the one known as the "potters," of which family there are several genera. They have earned their name from the fact that they build a nest which for all the world closely resembles a little clay pot or jar (see figure); and the circumstance that clay is the material used, in no way detracts from the resemblance. Some of these nests are of very light color, as was the one here figured, while others are much darker, being of a rich earth-brown. They are very rarely discovered, which is chiefly due to their small size and to the secretive habits of the makers of them, and there are not a

dozen specimens of these little nests in the immense collections of insects in the United States National Museum, at Washington. Last July (1920), the wife of the writer discovered the one here figured on Eighteenth Street, in Washington; it was attached to the under side of a leaf of an elm tree, near the corner of Park Road. Unfortunately, the wasp that built it was not in evidence. At this writing the specimen is in the insect collection of the National Museum. One of these solitary wasps is shown on back view in the accompanying cut, it having been drawn by the writer in that some idea might be gained of what curious little fellows they are. It is the *Eumenes* jar is sealed up. Quietly these little black and yellow wasps do their work; while not one farmer or agriculturist in an hundred are even aware of their existence.

Of all the known insects in the world, and there are untold thousands of them, there is no assemblage more remarkable, or filled with extraordinary interest, than is the natural history of ants.

There is a perfect host of species of ants, while, as a rule, they have for the most part been grouped in the family *Formicidae*, representatives of which are found in a great many parts of the world, aside from the polar and subpolar regions.

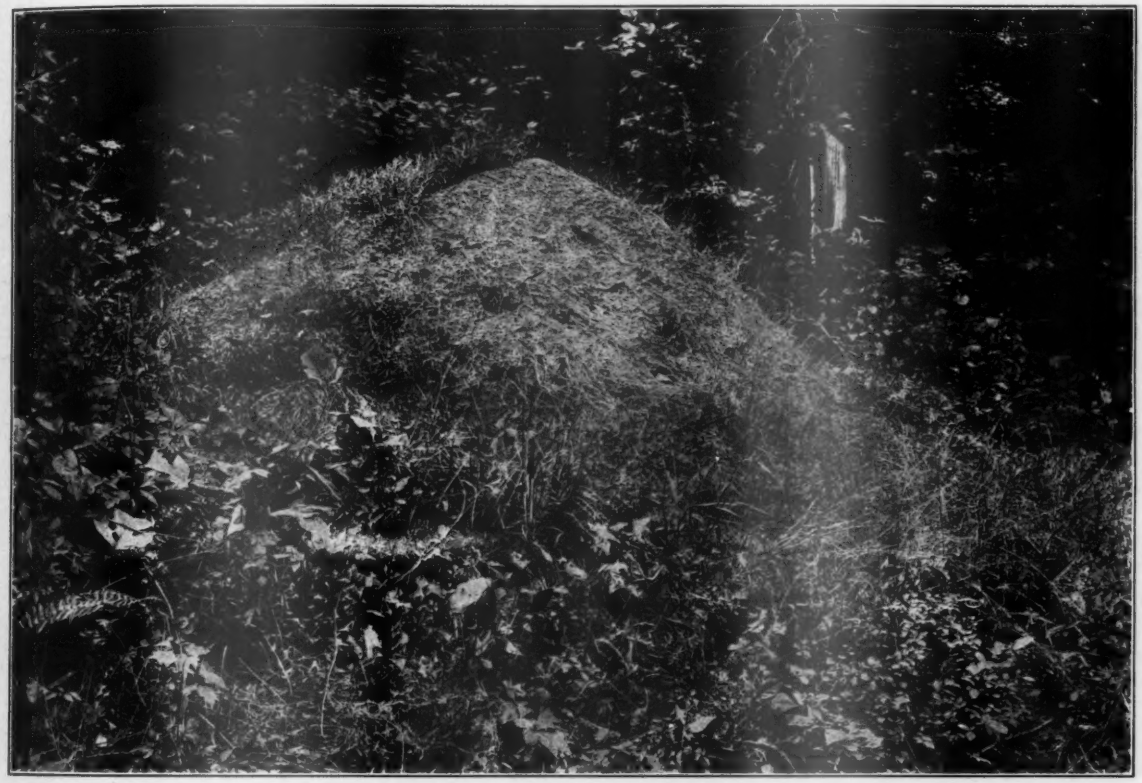


FIG. 7. IMMENSE NEST OF THE BLACK WOOD ANT

Probably it takes the ants a long time to build this mound, and several generations of them take part in it. Were we to cut a mound like this one in half, vertically, in such a manner as to show its internal construction it would be seen that the part above the surface of the ground contains some ten or more tunnels leading down into the ground below, and these terminate in distinct roundish cavities, some seven or eight in number, all interconnecting with each other. They are subterranean storehouses in which the ants store their food for winter use.

fraternus of science. The light markings are yellow, and the rest of the head and body black. Some of the species burrow into the pith of plant-stems, lining the excavation with clay. From an economic standpoint, this extensive family is an important one, as they kill and devour every year thousands upon thousands of the larvae of moths, butterflies, and beetles that feed upon the vegetable products of the farm and fruit-orchards. When a potter wasp meets with a caterpillar to its liking, it stings it, which completely paralyzes the victim. It then packs it away in its little pot, where it will constitute food for its own larvae, which will hatch out before the

We have many species of them, as well as their near relatives, in this country, and our economic and general entomologists have given them a very large share of attention. Whole bulletins and many elaborate works have been published on the biology and the ecology of ants, and yet we have hardly touched upon what still remains to be known about them.

"Certain ants enslave other species," says Packard, "have herds of cattle, the aphides; build complicated nests, or formicaries, tunnel broad rivers, lay up seeds for use in the winter time, are patterns of industry, and exhibit a readiness in overcoming extraordinary emer-

gencies, which show that they have sufficient reasoning powers to meet the exigencies of their life; their ordinary acts being instinctive—namely, the results of inherited habits. The leaf-cutter ants of Central and South America are famous from their leaf-cutting habits; the soldiers have large triangular heads, while the workers have much smaller rounded heads." What is said in this brief quotation is the merest hint with respect to ant history.

In some countries different species of ants systematically declare and go to war with each other. They organize armies down to the minutest detail; drill; march in column; deploy; use scouts; arrange and sustain a medical corps; attend to their wounded — carrying them off the field when disabled and so on. In some parts of Africa most remarkable species of ants occur, some of the species being so numerous and bite so severely that our own species are in peril when invading their territories.

In Figure 7 the writer gives you the reproduction of a photograph he made of an enormous ants' nest found by him near Cherrydale in northern Virginia. It covered a circle some fourteen feet in diameter, and, from apex to base in the center, had a height of four feet or rather more. Ants erected this entire mound, and many thousands of the large black species of that region occupied it at the time of its discovery. It was permeated by passage-ways in thousands of directions, and yet there was no evidence of confusion among the inhabitants when any disturbance aroused them, as stepping upon or pushing a stick into the heap. They rallied to the spot *en masse* and at once swarmed over the offending intruder or whatever was used to stir them up. Their bite is quite severe, and they will allow the twisting off of their heads before letting go their hold.

Hundreds of recorded experiments have proved beyond all manner of doubt that some species of ants possess excellent memories; they recognize their kin and greet friends and relatives by "shaking hands" with their antennæ. They possess a fine sense of direction and orientation.

While living in Habana, Cuba, the writer enjoyed studying a very minute red ant no bigger than the point of a pin. They invariably put in an appearance at breakfast time, usually coming from some crack in the cement wall of the room near the floor. They marched, single file, skirting all impedimenta, to the breakfast table. Arriving at the nearest leg of the latter in the line of their march, they ascended it, still in single file, and reaching the underside of the table cloth, they passed over it; and when once on top, over they went to the sugar-bowl to feed. They swarmed over the sugar *en masse,* and, after gorging themselves, returned to their retreat in the same order in which they came. This happened every morning until we finally broke it up by placing the feet of the table in small pans of water. They could not swim! But to appreciate the extraordinary history of ants, especially the South American and African species, one should study them in their habitats as well as read about them.

FIG. 8. KALLIMA BUTTERFLY OF THE EAST INDIES

One of the most perfect examples of protective mimicry among insects known to science. The insect is of a rich orange, blue and purple with finer markings. It is shown both open in flight and also closed on the twig.

There is no more interesting chapter in the history of insects than the one which touches upon their protective mimicry and coloration. Much, too, has been published and illustrated on this fruitful subject, even entire books have been devoted to it, an excellent one in mind being "Animal Coloration," by Dr. Frank E. Beddard, F. R. S., Prosector of the Zoological Society of London. Plate II of that work presents a colored representation of the famous Kallima butterfly.

Nearly every family of insects and spiders offers us examples of protective coloration and mimicry, while only a comparatively few of them have been properly described; it is an inviting field for the young descriptive naturalist.

A REAL MEMORIAL TREE

BY J. RUSSELL SMITH

WHY should a memorial tree be useless when it might just as well combine both use and beauty? Which would you rather have your memorial tree produce, leaves only, or leaves and nuts?

Trees are among the noblest of memorials, but they might just as well be nut trees, yielding edible fruit, as oak trees yielding inedible fruit, or other kinds of trees yielding nothing but leaves.

For beauty, no trees are more majestic or more beautiful than three native American nut trees, the pecan, the black walnut and the hickory.

There are now available for planting, grafted nut trees of one or more of these three species suitable for all that part of our country where wild specimens of any of these species grow, and for other territory beside. For example, varieties of pecan native in Indiana and Illinois will grow in all the lower elevations in the territory south of a line from Chicago to Boston. We do not yet know just how far north the northern pecan tree will bear fruit, but they will make beautiful trees as far as the line mentioned. Even to the north of this the hardy northern grafted hickories of the delightful shag bark variety will ripen their deliciously flavored nuts.

Black walnut trees have been found whose kernels come out in whole quarters, the pecans and shag barks in whole halves. The making of such trees for the market is a new art and a new business that will, in time, give us a great new industry offering many memorial trees of the highest attraction and desirability.

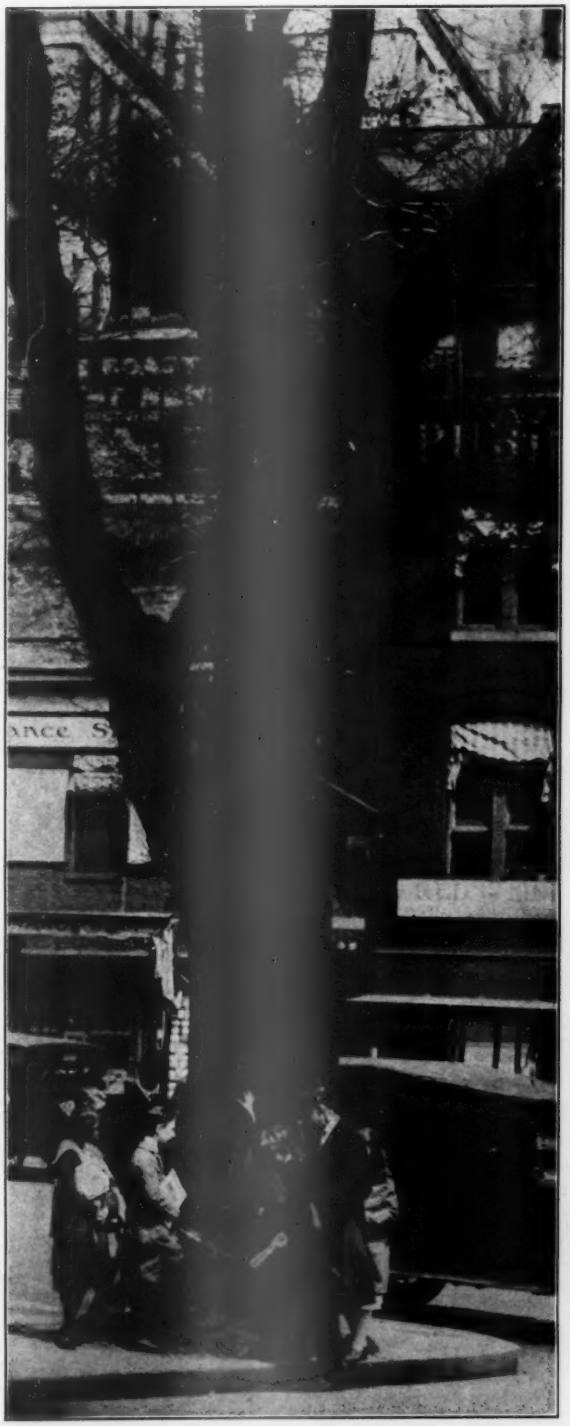
FAMOUS MORSE ELM GOES DOWN

The famous Morse elm, at the corner of Pennsylvania avenue and Fourteenth street, is gone, says the *Washington Times*. It was taken down at midnight following a long but losing battle for its life.

The famous elm, one of the first trees given a place in the Hall of Fame for Trees with a History by the American Forestry Association stood at the corner in front of the Willard Hotel and had seen every inaugural parade in Washington. It was named for Samuel F. B. Morse, inventor of the telegraph, who, tradition relates, often sat beneath the tree in the old days and recited to anyone who would listen the wonders of the telegraph. Many famous politicians met beneath the elm. The trunk of the tree was presented to the American Forestry Association.

Morse was born in April, 130 years ago. May 24 was the seventy-seventh anniversary of the opening of the first telegraph between Baltimore and Washington. Fifty years ago, in 1871, a bronze statue was erected to Morse in Central Park, New York City. He died April 2, 1872.

A delegation from the John Burroughs Club of the Force School, as guests of the American Forestry Association, visited the old tree Friday afternoon and Clifford Lanham, superintendent of trees and parkings, who di-



National Photo

THE LAST VISIT TO THE OLD ELM

The John Burroughs Club of the Force School sent delegates to pay a last tribute of respect to the famous old tree on the afternoon of the day it was taken down.

rected the operation of taking down the tree, explained to the children why it had died. In the delegation were Harold Roach, Charles Keene, Esther Rogers, Margaret Lowe and Dorothy Sheckells.

"Cutting away many of the roots of the tree to widen Fourteenth street killed the old elm," Lanham told the children. "Then, too, little or no air or rain could get to what roots were left. However, I will put a new tree there and see what we can do toward keeping it alive."

Lanham picked out the hour of midnight to take down the tree because of traffic conditions at that busy corner. Block and tackle were put in place by a big crew of men.

ANOTHER ROOSEVELT TREE

The first agricultural society to register memorial trees with the Association is the Agricultural Society of Queens-Nassau Counties, at Mineola. The trees were registered by Lott Van de Water, Jr., the secretary, and marked with the official marker. Theodore Roosevelt, for whom one of the trees was planted, often visited the grounds and spoke there.

The trees are of the scarlet oak variety, the acorns gathered from the grounds ten years ago and planted, developing into full growth.

President Robert C. Baird, of the Society, spoke briefly of the Memorial observance, and when markers were placed upon each of the five trees, told of the service given by those to whom the trees were planted.

MEMORIAL TREES AND MARKERS FOR NEW YORK BOYS

Underwood and Underwood National Photo

(Upper corner) Mrs. Catherine Dunn, mother of Capt. George Dunn, of the 77th Division, who was killed in France, planting a memorial oak in Central Park, New York, at the spot selected by J. S. Kaplan, forester of the Department of Parks.

(Lower) Large memorial tree marker for Company E, 307th Infantry, 77th Division, showing names of members registered on the national honor roll of the American Forestry Association. Hamilton Fish, Jr., now member of Congress from New York, formerly a major in the 77th Division, is inspecting the marker.

The first marker, placed by Mrs. Frank Arenet, of Hempstead, a descendant of Judge Effingham Lawrence, who was first president of the Society in 1841; the second, in memory of John Harold, former secretary and treasurer of the Society, by I. Cornell Remsen; the third, in memory of Thomas H. Bacon, who had been treasurer of the Society 36 years, and also for many years secretary of the race department and manager of the Society, was placed by Miss Lavinia C. Bacon, a daughter of Mr. Bacon; the fourth in memory of Col. Theodore Roosevelt, was placed by Capt. R.L. Vandewater; a fifth in memory of the soldiers who had died on the fair grounds, while the place was used as a base hospital.

Photo by Burt

THE DEDICATION

This is the first tree to be planted by an agricultural society and registered with the American Forestry Association, and it was dedicated to the memory of that great tree lover—Theodore Roosevelt.

National Photo.

MRS. MEDILL McCORMICK PLANTS THE ILLINOIS TREE

It was particularly appropriate for Mrs. Medill McCormick and her children to plant Illinois' gift to the American Forestry Association, as the Chicago Tribune, owned by the McCormick family, is aiding vigorously in the campaign for planting of memorial and roadside trees throughout the country.

"EVERYBODY LOSES WHEN THE FORESTS BURN,"

THE call of the American Forestry Association on the editors of the country to rally to the proclamation of President Harding for Forest Pretection Week was answered from every section of the country. Data from the Association's news service was carried in full by hundreds of

SPEAKING OF FOREST PRESERVATION—HOLLAND HELPS.

Berryman—in the Washington Star.

them and commented on. The Baltimore *Evening Sun* told the whole story in a one line editorial which said "Everybody loses when the forest burns." This "one liner" followed a longer one that went into the forestry question at length. Some of the comment in part follows:

Collier's Weekly: President Harding's proclamation designating Forest Fire Protection Week will have interest for you when you know some of the important facts behind it.

Whether you buy, own, rent, or build, the cost of the house you live in is materially affected by every forest fire which further depletes this nation's supply of lumber timber.

Berkeley (Calif.) Gazette: Forest Protection Week, will result in a still stronger demand for a national forest policy in this country, says a statement from the American Forestry Association. In the Snell Forest Policy Bill is provision for cooperation with the states in forest fire prevention and the proclamation of President Harding will, the Association says, go a long way toward putting this important subject right up to the people. National demand for a real practical national forest policy is evidenced by the endorsement of the Snell Bill by nearly 100 organizations of all types of industrial and social groups in the United States.

Providence Bulletin: The new bill in congress is sponsored by the American Forestry Association and favored by several large groups of users of timber—bodies with interests so large and so widespread they are not likely to want to mislead the government into an unprofitable venture. Reforestation is insurance against a form of bankruptcy in national timber resources that is undoubtedly in prospect if the country does not mend its ways.

Utica Telegram: We Americans are a reckless sort of people, in many ways. We have been prodigal of the natural resources with which Providence has endowed us. Especially, have we wasted our supply of timber, both by wantonly cutting down more than we needed and, still more, by not guarding against the hazard of fire.

Washington Times: That little spiral of smoke for which the forest ranger watches in Oregon has a direct effect upon the man in Maine who likes a Florida orange for his breakfast now and then.

If the spiral of smoke breaks into a roaring, scorching forest fire we are all affected. Do you buy a new hoe for the

"I've Got What I Want"

Gibbs—in the Baltimore Evening Sun.

garden this spring the forest fire hits you. The hoe handle is made of wood; your breakfast orange comes in a wooden box just as do thousands of other things touching your daily life. The price of lumber influences the cost of your breakfast.

Philadelphia Inquirer: That we Americans have scandalously wasted our great natural resources is an admitted fact. For years we have acted upon the theory that they are boundless. This criminal extravagance has been nowhere more evident than in the destruction of our forests. Even now, with all that has been said upon the subject, with all that has been done to stay further recklessness, the importance of forested areas to our national life is still imperfectly realized.

The Outlook: President Harding recently proclaimed "Forest Protection Week", and Secretary of Agriculture Wallace has written letters to the Governors of all the States asking their cooperation in a nation-wide observance. The effects mentioned by Mr. Wallace are reinforced by those noted in a circular issued by the American Forestry Association. It declares that "fires destroy over $25,000,000 worth of timber every year and kill the reproduction upon thousands of acres of forest lands." Already we have a timber shortage, but within fifty years "it will become a blighting timber famine." Forests can be protected from fire, re-growth can be encouraged and conservative cutting can be practiced. But it takes from fifty to one hundred years to mature a timber crop. "Forest devastation must be stopped, lands now in forest must be kept continuously productive, and forest lands now devastated and idle must be put to work," concludes the American Forestry Association.

People's Home Journal: From a wooden bed, over floors of wood, through a wooden door to a breakfast table of wood—that is probably your morning routine. At table, in a newspaper made from pulp wood, you read dispatches brought over wires supported by wooden poles. Wood has been called the "backbone of industry." A dozen years ago President Roosevelt first awakened the nation to the alarming

THEN THERE IS THIS KIND OF WORM.

Knott—in the Dallas Morning News.

consequences of forest devastation. Does not even a moment's thought serve to convince you that the reforestation projects, which have been revived again in Washington, demand your most earnest attention?

Newark Evening News: By virtue of President Harding's proclamation for

SAYS THE BALTIMORE EVENING SUN

Forest Protection Week, the National Forest Fire Prevention Committee, is taking advantage of the opportunity to call public attention to the importance of the movement for the preservation of the country's forests. The menace of fire, which accounts for an annual loss of $20,000,000 is emphasized, and an appeal is made to the individual to realize personal responsibility in the effort to reduce it. One-eighth of the value of trees thus destroyed is charged up to pleasure seekers and particularly to careless smokers.

Baltimore Evening Sun: Opportunities are appearing almost every day for Americans to prove whether they learned anything from the war. In no smaller degree does the opportunity exist to show whether we have learned by experience in the matter of conserving our national resources.

It is for the purpose of stimulating our thought in this direction that the national Government, in cooperation with the States, designated Forestry Week.

The wastefulness of the American people in respect to their forests would be criminal if it were not so thoughtless. During the war lumber was one of the essentials. With the ordinary grades we did not feel the pinch of necessity as we probably should twenty-five years from now, at the rate at which we are wiping out our timber resources and failing to replenish them. But there was one type of lumber which we did need very badly during the war—spruce. The wood is essential in the manufacture of airplane propeller blades. Due to the past wasteful methods of timber cutting and the laxity of our precautions against forest fires, the supply of this material was largely confined to the two States of Washington and Oregon. Surely it would seem now that we should profit by the lesson and see to it that the spruce forests of those States are protected and spruce reserves elsewhere built up. But the forestry officials tell us that the same wasteful methods of cutting spruce are continuing.

Such considerations are well worth public attention, if Forestry Week is to mean anything at all. Even if we did learn such facts from our recent experiences, we have still to prove our purpose to profit by the lessons.

IN YEARS TO COME.

Craig Fox—Rochester Democrat-Chronicle.

WILL IT COME TO THIS?

Donahey—in the Cleveland Plain Dealer.

Rochester Democrat-Chronicle. — After all, the inertia and the apathy are the result of the lack of information. To be sure this is not easy to excuse. There is hardly a paper in the country which has not been hammering the idea of forest conservation into the public consciousness for years, to say nothing of the numerous and efficient organizations for such work. But, even if the ignorance is hardly excusable, the fact remains that the public is lamentably ignorant of forest needs. If this were not so there would be such a clamor for proper care of the dwindling timber supply that some deaf legislative ears would suddenly find that they could hear.

Washington Herald: By proclamation of President Harding, this is Forest Protection Week, when not the fancy, but the serious consideration of Americans is to be turned, neither lightly nor sadly, but constructively to the protection of our remaining forests, and the reclaiming by tree planting, otherwise useless lands. We have wasted our forest substance like the proverbially drunken sailor does his pay.

Yakima (Wash.) Herald: Forest resources in the east and south are at the point where 61 per cent of our total stand of saw timber lies west of the Great Plains, and over 50 per cent in the three Pacific coast states, according to the American Forestry Association of Washington, which is directing the campaign for a national forest policy.

Is it not high time we took steps along the lines of the Snell forestry bill for forest protection?

Billings (Mont.) Gazette: State forestry, fortunately, seems to be on the eve of a remarkable development. A survey conducted by the American Forestry Association, says that keen interest is being manifested throughout the country in various phases of forest legislation. Montana has vast areas of timber, and should be as interested as any state in the union in the preservation and development of forests. The American Forestry Association points to the south where Texas is considering the adoption of a comprehensive forest policy with particular emphasis on fire protection and reforestation, and the adoption of a severance tax similar to that already in force in Louisiana. It is to be hoped that the movement will bear fruit in the enactment of a considerable number of progressive and effective forestry measures.

Newark Evening News: The report on the subject of the adoption of a national program of forest protection, recently submitted to the United States Senate by its

WHY CAMPERS SHOULD BE CAREFUL ABOUT FIRES.

Perry—in the Portland Oregonian.

committee on reconstruction and production, of which Senator Calder of New York is chairman and Senator Edge of New Jersey a member, has evoked much comment in approval throughout the country. This report shows that a $20,000,000,000 construction program would just about put this country on a pre-war basis.

Of it Charles Lathrop Pack, president of the Association, says in part:

"If any such program as outlined by the Senate committee, involving a reconstruction expenditure of $20,000,000,000 can be even approximated at this time, it would bring us to forceful realization of the forest products situation that the American Forestry Association has been warning the public against for years. The Calder report is the greatest campaign argument on behalf of a national forest policy that has ever been put out."

Bangor Daily Commercial: The country has been called upon by President Harding to observe Forest Protection Week and the call comes with vital force to Maine for our state for its future prosperity is greatly dependent upon its forests.

We cannot too strongly point out the need of great care in the woods. The annual destruction in the country by reason of forest fires is approximately $20,000,000, a distinct economic loss which can be avoided in great part by proper caution by those who visit the woods. Nor does the loss in timber spell the full loss. The removal of the shade trees dries up the water courses and strikes a blow at the water powers.

Minneapolis Tribune: Minnesotans should have a peculiar interest in "Forest Protection Week" proclaimed by President Harding and the governors of many of the states. Governor Preus in his proclamation calls attention to the fact that the loss by forest fires in this state in the last five years aggregates $30,000,000, or more than the aggregate losses in the next seven highest states.

It is important that school children should be taught the necessity of preserving the forests from fire. The American Forestry Association, which is concerning itself with forest protection and forest expansion, offers warnings that are equally good for old or young.

American citizens owe it to themselves and to those who shall come after them to maintain an adequate timber supply. It is good business and good sense.

Cleveland Plain Dealer: Through observances of one kind and another a serious attempt has been made to impress upon the people the serious condition into which our forests have fallen and to enlist them in a nation wide campaign of preservation and protection, particularly against fire.

All this loss can be avoided if campers and picnickers can be made to realize that the woods must be protected. There is a national loss involved in forest fires just as there is in the destruction by fire of residence properties and business blocks. The value of the latter we recognize by insuring them. We should be willing to recognize the former at least by the exercise of reasonable precautions.

Atlanta Constitution: In an essential sense the idea underlying the motive for "Forest Protection Week" is to arrest the fearful annual wastage of American forests by fires, the vast majority of which are preventable and most of them due to gross carelessness.

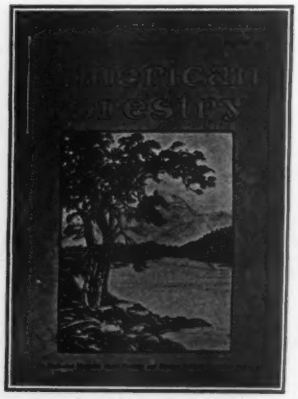
SUSPENSION BRIDGE TO BE BUILT

TO permit tourist travel by means of animal transportation from the south to the north rim in Grand Canyon National Park, Arizona, the National Park Service, of the Department of the Interior, is to build a suspension bridge across the Colorado River. The north side of the park, or the north rim as it is called, is today practically unvisited, owing to the difficulties attendant to getting horses or mules across the Colorado. Those who have made the long journey from railroad points in Utah have been tremendously impressed with the scenic grandeur of the north rim. It is about 1,500 feet higher in altitude than the south rim, and the great chasm viewed from this side reveals a new and alluring aspect. With the construction of the suspension bridge, rim-to-rim travel is destined to become one of the most fascinating of park trail trips.

BECOME A MEMBER

Any person may become a member of the American Forestry Association upon application and payment of dues.

PLANT TREES
PROTECT FORESTS
USE FORESTS



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American Forestry Association

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I hereby request membership in the American Forestry Association and enclose check for $.....

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Subscribing Membership, per year	$ 4.00
Contributing Membership, per year	10.00
Sustaining Membership, per year	25.00
Life Membership (no other dues)	100.00
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When druids worshipped in the dim groves of "the oaks of God," men said that trees had souls. Today science has revealed to us a new wonder in trees as *living* things—organisms that breathe, assimilate food, grow, reproduce, suffer from disease, hunger and thirst. If you do not protect them from their enemies, they die prematurely. Most tree troubles can be corrected by real Tree Surgeons—if taken in time.

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ATTENTION, FORESTERS

AMERICAN FORESTRY will print, free of charge in this column, advertisements of foresters wanting positions, or of persons having employment to offer foresters. This privilege is also extended to foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITIONS WANTED

YOUNG MAN, 36, single, technical trained and practical experience in forestry, tree surgery, landscaping and orchard care, wants to get in business for himself as city forester in an excellent location anywhere in the United States. Will also consider position as forester on large estate. Employed at present and best of references. Address Box 2065, care AMERICAN FORESTRY Magazine, Washington, D. C.

POSITION WANTED by young graduate forester. Six years practical field work in forestry and lumbering. Am now employed but desire change. Box 2075, care AMERICAN FORESTRY, Washington, D. C. (4-7-21)

FORESTRY GRADUATE, age 30, several years experience in forest work, including city forester, landscape development, portable logging, reforestation, knowledge and experience in farming and farm machinery. At present employed along technical and administrative lines. Will be open near future for responsible position, preferably in development and management of private forest or estate. Box 2070, care AMERICAN FORESTRY Magazine, Washington, D. C. (4-7-21)

YOUNG MAN with master's degree in forestry and who also has had experience in city forestry, tree surgery, and esthetic forest planting desires a position in any phase of forestry—logging, lumbering, forest management, or city and esthetic forestry—where marked ability will bring advancement. Would also consider a position as part time instructor in botany, the remaining time as city forester. Have taught botany while a graduate student in one of the foremost universities in America. An ex-officer of the World War. Address Box 2080, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-6-21)

POSITION WANTED by graduate forester, veteran 10th Engineers, at present lumber inspector Pennsylvania System, experience in French forests, Southern Pine and Northern Hardwoods. Desire position as forester for private estate or other work. North preferred. Address Box 2085, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-6-21)

POSITION WANTED BY FORESTER. A healthy United States citizen, 36 years old, actively engaged in logging in equatorial America, where he has done considerable practical and scientific pioneer work, now wants to return to work under more civilized and progressive conditions. Has 12 years' bush and mill experience. He works best where difficulties and problems are greatest. He is a practical enthusiast for constructive and reconstructive forestry, and desires to make connection with a body recognizing said qualities. Address Box 2090, care of American Forestry Magazine, Washington, D. C. (6-8-21).

EX-SERVICE MAN wishes employment with some Forest Construction Concern or Irrigation Company which can use a young man who is a Technical High School Graduate, and who is a Mechanical Draftsman with some slight knowledge of plane surveying. Willing to work and can do same. Address Box 2095, AMERICAN FORESTRY MAGAZINE, Washington, D. C. (6-8-21)

CAN YOU USE ABILITY.—Young man, technically trained with master's degree in forestry desires position of responsibility with some lumber or forest products company. Fifteen months experience. Address Box 212, Lockhart, Alabama. (8-10-21).

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	1.50
PRACTICAL TREE REPAIR—By Elbert Peets	1.50
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	1.50
FOREST VALUATION—By H. H. Chapman	1.50
CHEMISTRY OF PULP AND PAPER MAKING—By Edwin Sutermeister	4.00
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.00
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	2.00
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	1.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.50
LUMBER AND ITS USES—R. S. Kellogg	2.25
FORESTS, WOODS AND TREES IN RELATION TO HYGIENE—By Augustine Henry	5.25
DEVELOPMENT OF FOREST LAW IN AMERICA—By J. P. Kinney	2.00
STUDIES IN FRENCH FORESTRY—By Theodore S. Woolsey	4.00
FOREST PHYSIOGRAPHY—By Isaiah Bowman	4.00
KEY TO THE TREES—Collins and Preston	1.00
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record	2.00
PLANE SURVEYING—John C. Tracy	2.00
FOREST MENSURATION—Henry Solon Graves	4.00
FOREST PRODUCTS, THEIR MANUFACTURE AND USE—By Nelson Courtland Brown	4.35
THE ECONOMICS OF FORESTRY—B. E. Fernow	1.61
FIRST BOOK OF FORESTRY—Filibert Roth	1.10
PRACTICAL FORESTRY—A. S. Fuller	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel B. Green	2.00
TREES IN WINTER—A. S. Blakeslee and C. D. Jarvis	2.00
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume	7.50
Half Morocco Binding	10.00
HANDBOOK OF THE TREES OF THE NORTHERN U. S. AND CANADA, EAST OF THE ROCKY MOUNTAINS—Romeyn B. Hough	4.00
Half Morocco Binding	10.00
GETTING ACQUAINTED WITH THE TREES—J. Horace McFarland	1.75
HANDBOOK OF TIMBER PRESERVATION—Samuel M. Rowe	1.00
TREES OF NEW ENGLAND—L. L. Dame and Henry Brooks	1.50
TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst	1.50
TREES—H. Marshall Ward	1.50
OUR NATIONAL PARKS—John Muir	1.50
PRACTICAL FORESTRY—John Gifford	1.50
LOGGING—Ralph C. Bryant	4.00
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott	2.00
MANUAL OF FORESTRY—VOL I—Ralph C. Hawley and Austin F. Hawes	1.50
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves	2.00
SHADE TREES IN TOWNS AND CITIES—William Solotaroff	1.50
THE TREE GUIDE—By Julia Ellen Rogers	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary	1.25
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THE UNITED STATES FOREST POLICY—By John Ise	1.25
THE KILN DRYING OF LUMBER—By Harry D. Tiemann	4.00
MODERN PULP AND PAPER MAKING—By G. S. Witham, Sr.	4.00

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PAPER FROM SOUTHERN PINE AND RED GUM

THE possibility of using southern pine and red gum for the production of high grade book and magazine paper has been demonstrated in recent tests at the United States Forest Products Laboratory, Madison, Wisconsin. The experiments indicate that one cord of loblolly pine and one of red gum are together capable of yielding one ton of paper, at a cost which would allow a good profit under prevailing conditions. The utilization of southern pine for this purpose would also spread the burden of the pulpwood supply over considerable territory which has a large annual growth of timber. Book paper requires for its manufacture two kinds of wood, a long-fibered wood, such as spruce, to impart strength, and some short-fibered hardwood to give the formation, finish, and other printing qualities. The southern pines are long-fibered woods, excellently suited for the manufacture of wrapping paper and fiber board, but their pitch content and the difficulty of bleaching them have heretofore been obstacles in the way of their use for white paper. These obstacles, it has been shown, can be overcome in a large measure by proper cooking conditions and improved bleaching methods. Red gum is typical of many southern hardwoods that might be used with the pines for the manufacture of the better grades of printing paper.

PENNSYLVANIA'S FIRE TOWERS

Major R. Y. Stuart, Deputy Commissioner of Forestry, has announced that twenty-five sites have been definitely fixed for forest fire observation towers that will be erected by the Department of Forestry this summer. Orders for fifty towers have been placed with the manufacturers. The remaining locations will be selected by George H. Wirt, Chief Forest Fire Warden, within the next few weeks.

The Department of Forestry is planning to build 168 miles of new roads and 278 miles of trails in State Forests this year. These roads and trails will enable foresters to reach fires more quickly.

LASHES OF WOODCHUCK SKINS

THE following interesting letter from Dr. Robert T. Morris, of New York, to Dr. R. W. Shufeldt, contributing editor to AMERICAN FORESTRY, is reproduced in full:

"In your interesting article on the subject of woodchucks and porcupines in the current number of AMERICAN FORESTRY, I note the statement that you have not known of woodchuck skins being collected for the purpose of making whip lashes. When I was a boy all of the farmers in the vicinity of our family farm in Newtown, Connecticut, used woodchuck skins in this way. The skins were put in a thick mixture of wood ashes and water until the hair could be brushed off. They were then treated in two different ways by different farmers. Some of them rubbed alum into the skin and worked it between the hands every day until it was soft and pliant. Others put it in a thick mixture of dried sumac leaves and water.

"A good deal of skill was used in going around this skin with a knife in such a way as to cut it into a long strip. The strip cut in many circles in this way was straightened out by fastening one end of it to a limb of a tree and tying a stone to the other end, leaving it there for several days. The leather meantime being oiled occasionally.

"The strips of woodchuck skin cured in this way were used for the long whip lashes for driving oxen, for flail strings, for harness lacings, and other leather string purposes. Elskins were sometimes put in along with the woodchuck skins in the original preparation and were then used for flail strings and for string lashings of various sorts."

REDWOOD GROVE PRESERVED AS MEMORIAL

A BEAUTIFUL grove of redwood (*Sequoia sempervirens*) has been dedicated as a memorial to Colonel Raynal C. Bolling, of the United States Air Service, first American officer of high rank to give his life in the World War. Dr. J. C. Phillips, of Wenham, Massachusetts, brother-in-law of Colonel Bolling, has established the Bolling Memorial Redwood Grove on the South Fork of the Eel River in Humboldt County, California.

The grove has been purchased by Dr. Phillips and a deed will be given to the Save the Redwoods League. It will be held by the League until it is made public property and assured of being preserved for the generations to come.

A memorial tablet to Colonel Bolling will be placed near the highway at the entrance to the grove.

BALSA WOOD LIGHTER THAN CORK

BALSA wood, growing notably in Costa Rica and Ecuador, is the lightest wood known, weighing only 7.3 pounds to the cubic foot. Cork weighs 13.7 pounds. Growing more rapidly than almost any other known tree, it is said that within four years a balsa tree will attain the height of 30 feet, with a diameter of ten inches. It is as durable as cedar. The wood is white, extremely straight grained and easy to work. It is soft when green, but seems to harden later. It is used extensively for making life rafts and life preservers, and it is thought that it will eventually constitute a valuable source of pulpwood. A brown-colored cotton-wool, commonly used for stuffing pillows and mattresses, is also produced. It is believed that the tree would flourish in Florida, and because of its rapid growth would spread rapidly over the southern part of the State.

WOODEN DOORS DATING BACK TO MIDDLE AGES.

AMONG the famous doors of history are the carved wooden doors of the church of Santa Sabina, Rome, depicting in relief, scenes from the Old and New Testament. These are one of the most remarkable examples of early Christian sculpture extant.

In the earliest times, as in Babylon, doors swung on sockets instead of hinges. In Roman days wooden doors were decorated with bronze and inlaid, and throughout the Middle Ages richly carved doors of wood adorned the churches. In the Gothic period, wooden doors were decorated with wrought iron hinges which were often elaborated into intricate ornamentation, covering a large part of the door. The doors of the cathedral of Notre Dame in Paris of the Thirteenth Century, are the finest examples of this class. During the Renaissance in Germany and France, elaborately carved doors were among the most beautiful products of wood sculpture.

Some of the old English doors were formed of narrow planks placed side by side, and in dwelling houses generally, in the Middle Ages, the doors were small and fairly simple, meant for strictly practicable purposes and often provided with some means of defense. The doors of the Norman period were round-headed, while with the 13th century came the doorway with the pointed arch and later the flattened arch.

In the case of interior doors, splendid old polished mahogany doors were important features in some old English homes and there were old oak doors of wonderful beauty, especially when found in oak paneled rooms.

Haphazard selection of doors of the ready-made variety should not be allowed in the building of a fine home, but the doors should be designed by the architect who builds the structure that they may be in keeping with the general style of the house. Upon the attractiveness and distinction of the door and doorway depends the visitor's first impression of the home he is about to enter.

THE "FORD" FOREST

THE properties of Henry Ford have expanded to take in a railroad, a mine and a forest. Now timber from virgin forests of the Upper Peninsula of Michigan will be used to furnish lumber for Ford automobile bodies and other requiremetns. Another link added to the chain of Ford industries is the Ford sawmill. located just outside of Detroit. Thus this great manufacturer protects his interests by gradually becoming less and less dependent upon outside sources of supply through the acquisition of valuable resources within his own organization.

The Saw In History

Once upon a time.
A man wanted to make.
Two pieces of board.
Out of one piece.
The thing he used.
To work with was.
The first saw.
It was the nose.
Of a fish.

Would you care to read about it? If so, write us for "The Saw in History." It is a sixty-five page book, completely illustrated. We will send it to you free of charge. Address your letter to Department B.

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SPLIT POSTS AND ROUND POSTS

IS a split fence post as durable as a round fence post? This is a question frequently asked of the U. S. Forest Products Laboratory. The fact is, one kind of post will last about as long as the other if the amount of heartwood is the same in both says the Laboratory. But if the percentage of sapwood is increased by splitting, the split post will be less durable, and if the percentage of heartwood is increased, it will be more durable than a round one. Posts of spruce, hemlock, or any of the true firs are exceptions to this rule, because their heartwood and sapwood are about equally durable.

When posts are to be treated with creosote or other preservative, a round post is preferable to a split post, because of the comparative ease with which the sapwood can be treated. The heart faces on split posts do not, as a rule, absorb preservative well. Split red-oak posts will take treatment, because the wood is very porous, but the heart faces of split posts of many other species, notably white oak, red gum, and Douglas fir, resist the penetration of preservative, even under heavy pressures.

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A "COLUMN CONDUCTOR" ON FORESTRY

Editor's Note:—The following article is by Don Marquis, one of the most widely known "column conductor's" in the country and his daily column in the New York Sun is widely read and quoted.

THE ALMOST PERFECT STATE

IN the Almost Perfect State no man man shall be allowed to cut down a tree unless he plants at least two.

The pig that lies down in the trough wastes half of his own swill. Greed is always stupid. The wanton destruction of the national resources in this country must be paid for not only by this generation, but by the next one and the next one after that.

Formerly in thoughtlessness, and now in a callous disregard of the prosperity of millions living and of millions yet to be born, the timber owners of America have wasted and are wasting one of the most splendid gifts of nature—in their blind haste for the immediate dollar, cheating themselves, cheating their neighbors and cheating posterity.

A gift of nature, we say... but in reality nature has her prices, too. The earth will work in partnership with humanity and cheerfully render up her increases, but likewise the earth demands fair treatment. The soil not only gives, but it exacts, and in the large economy of continents and worlds the scales and balances are nice to the weight of an ounce of potash. Let a tribe cheat the earth . . coin its rainfall and its heat and its wind into dollars beyond present need and reason, use up within this decade all the nitrates the soil was putting into a savings bank for future generations, always taking and giving nothing in return, always reaping and never sowing . . . and the earth will take a vengeance upon that tribe: choke the streams and overlay the valleys with sand, and then sulk for a century or so in sullen infertility.

Unscientific lumbering not only has destroyed millions in present wealth and future wealth of timber alone, but it has done a more comprehensive work of ruin than that. It makes deserts. Deserts of the slopes upon which the trees stood, and deserts of all the surrounding lands dependent upon the forest reserves of water for their vegetation and for the rejuvenation of the soil.

A forest not only attracts rainfall, but it conserves it; the roots of the trees and of the underbrush hold it in the ground, and through the springs and creeks it is slowly distributed to the adjacent plains and valleys. But with the forest gone the rainfall passes off at once in freshets; there is a season of flood and a season of drought; the floods carry the arable soil into the creeks and rivers; where vegetation was, there is Sahara; where the streams were navigable they are choked with dirt; where there was water power, there are winding beds of sand.

And as vegetation declines throughout a region the rainfall which was attracted by that vegetation, and withheld in its intricate nets, more and more withdraws. The climate changes. Drought becomes permanent. And so we have millions of acres laid waste through the greed or ignorance of the timber slashers who killed five growing trees to reach one grown one because it seemed more profitable at the moment to lumber in that fashion. Was it not their own land; had they not bought that timber? Why, yes—the next generation be damned, and to Gehenna with the surrounding country.

And the next generation is damned with poverty, and the surrounding country does become a sort of arid Gehenna. For the earth takes at their word and in their spirit the tribes that crawl and chatter upon its shaggy flanks, and the foolishness of the fathers is visited upon the sons even beyond the third and fourth generations.

However merciful Heaven may be, this earth swings onward in a humor that is roughly and grimly just, and the clans that are not honest with it are crushed beneath the vast, impersonal revenges of its going.

The Government of the Almost Perfect State will be based upon a study of the earth itself, and its moods and spirit.

DON MARQUIS.

LUMBER PRODUCTION IN AUSTRIA

WITH the best success, little can be expected in less than five years by the Austrian government in its work of reconstructing the lumber industry of that country, reports the United States Trade Commission in Vienna. The potential production of lumber of present Austria is estimated from 141,240,000 cubic feet to 176,550,000 cubic feet annually. To realize this amount the entire industry must be constructed from the beginning; railways must be built, cable railways erected, trucks purchased, sawmills secured and installed, camps fitted up and roads laid. The Austrian government is planning to push through the work in spite of all difficulties.

Prior to 1914, the production and export of softwoods constituted one of the leading Austrian industries and importation was necessary only in the case of rare woods for special purposes and hardwoods from America for furniture. Lumber exports from Austria are today practically at a standstill.

PLEASANT THINGS SAID TO THE EDITOR

"You have a corking fine issue this month (May). I was very much interested in the editorials."

WARREN B. BULLOCK.

"Am mightily interested in the article on reclaiming land in Tennessee and Mississippi by planting black walnut. This is fine work, and THE TIMBERMAN wishes to compliment you on your efforts in behalf of forest conservation."

GEORGE M. CORNWALL.

"The American Forestry Magazine seems more interesting each issue. The entire family looks forward to its coming. Your nature study articles are enjoyed by the children also."

JULIUS TISCH.

"I cannot begin to tell you how thoroughly I have enjoyed the AMERICAN FORESTY magazine which I took last year and the interest which was manifested in its contents by our literary club. I sincerely regard it as one of the best magazines before the public today."

MISS GERTRUDE BLACK.

"I am impressed by such an excellent magazine as you are publishing and by what it can do toward educating the public along the lines you are engaged in."

THOMAS A. McBETH.

"I enjoy reading the magazine. The April number was an especially good one."

F. O. GRAVES.

"It is interesting to me to see how many business men are becoming interested in the entire forestry problem. I am sure that the forward movement during the next ten years is going to be a far-reaching one. The April number of the magazine was admirable."

J. W. TOUMEY,
Dean of Yale Forest School.

"We have struck a high mark in the April number and I hope that we can continue to keep up the same speed."

ARTHUR H. CARHART.

"I enjoy AMERICAN FORESTRY very much and get much useful information from it."

J. M. WILLIAM.

"I have read Dr. Shufeldt's article on line in ponds and marshes in the May number with the very greatest interest."

PROF. ELMER LOUIS KAYSER.

"If there is anything I can do in spare time to further your campaign, our campaign, I am more than ready to do it. Any campaign for vitally important legislation should be based on the stirring up of public interest and educating the public. Lack of public interest is the explanation of the disappearance of our forests and our wild life."

COL. J. N. MUNRO.

"I am very much interested in the Association and I am pleased to note that all interests are now agreed upon a form of national and State legislation which will save a great part of our forests from being destroyed. I wish you every success in your laudable undertaking."

H. J. GREGG.

"I am enjoying AMERICAN FORESTRY very much indeed."

MRS. WM. M. GEARHART.

"A splendid magazine."

MRS. L. H. HERBERT.

"I have been an interested reader of the AMERICAN FORESTRY MAGAZINE for at least ten years, and along with my connection with the Trexler Lumber Company it has helped me wonderfully."

HOWARD F. ADAMS.

"I wish to renew my subscription to your valued magazine. I enjoy reading it very much and look forward every month to its appearance."

D. H. KATZ.

"Your magazine is a most wonderful and interesting one. I have been a member since it started, I think, around twenty years ago, and it has always been very interesting to me."

ALFRED J. KULL.

"We enjoy AMERICAN FORESTRY very much and feel that it contributes greatly to the conservation of our forests and a general beautifying of America by tree planting.

MRS. RUTH DAY.

"Your letter telling of the prospect of legislation that will preserve our forests so they will supply our future needs is the pleasantest piece of news I have received for a long time in this most trying time in the world's history."

MARY D. HUSSEY.

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ONE MILLION CORDS OF ALASKA PULPWOOD SOLD.

One million cords of pulpwood on the Tongass National Forest, Alaska, has just been sold by the Forest Service of the United States Department of Agriculture to the Alaskan-American Paper Corporation. The timber is located along the east shore of the Behm Canal, Revillagigedo Island, about 32 miles from Ketchikan, the largest city in the Territory. The contract price of the timber was 60 cents per 100 cubic feet for spruce and cedar, and 30 cents per 100 cubic feet for all other species. The sale area covers 45,000 acres and extends for 55 miles along the coast. Twenty per cent of the forest is spruce, 66 per cent hemlock, and 14 per cent Alaska and western red cedar.

The Alaska forests also contain the second chief essential of the pulp and paper manufacturing industry, namely, water power. No accurate survey of the power resources has yet been made, but known projects have a possible development of over 100,000 h. p., and it is believed that a complete exploration of the National Forests in southern Alaska will show not less than 250,000 potential horse power that can be developed from water.

Forest Service cruisers are now working in Alaska collecting data for further use and development of the forests. One block of timber containing 335,000,000 cubic feet —enough to keep a 100-ton pulp mill running, has been advertised and is now ready for sale.

CONTROLLING DAMPING-OFF

The best method for controlling damping-off in forest nursery stock appears to be the disinfectant treatment of the seed bed, say specialists of the United States Department of Agriculture, who have recently completed a series of investigations to work out control measures. A report of their investigations has just been published as Department Bulletin 934, Damping–Off in Forest Nurseries. Sulphuric acid, they say, has been found very useful for conifers, as they are apparently especially tolerant of acid treatment.

In most nurseries, if the minimum effective quantity of acid is used, there is no need of any special precautions to prevent injury to the seedlings. The minimum quantity must be determined for each locality, for the specialists say that no single treatment can be found that can be universally applied without change in details.

The most serious losses in conifers, according to the bulletin, are from the root–rot type of damping–off, which occurs after the seedlings appear above the ground. This type of the disease is most serious under extremely moist atmospheric conditions. The type of damping–off which appears later when the stems become too rigid to decay easily is ordinarily less important than the earlier type. Seedlings more than two months old are, as a rule, able to recover from infections. The specialists believe that thick sowing favors the disease, and that soil acidity is in general unfavorable to it.

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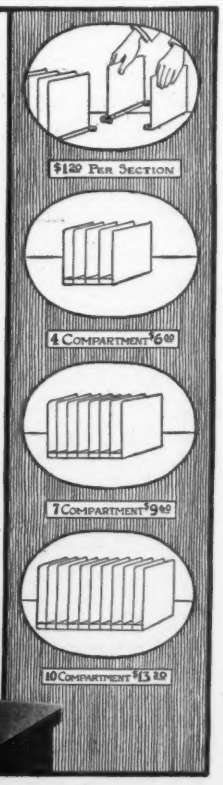

WOMEN HELP IN FIGHTING FIRES

WOMEN helped in the hazardous game of fire-fighting during the past season in the Southwest, according to the forest officers of several of the Arizona and New Mexico forests. Some were stationed on the lookout towers of lonely high peaks, others working remote forest telephone exchanges through many hours when the danger was acute, and others on the very fire line itself, leading or fighting the fires with the hastily assembled crews. Forest fire fighting has generally been conceded a full sized man's job, but the long annals of the Forest Service throughout the West are filled with stories of women taking a helping hand at the various phases of the game. This past season in the Southwest was no exception.

On the Rincon Mountains, a part of the Coronado Forest in Southern Arizona, the high Spud Rock Lookout point was "manned" during the fire season by Mrs. Lyle B. Smith, wife of the local Forest Ranger. Mrs. Smith, in addition to her lookout duties, cleaned and brushed out a number of miles of trail in the vicinity of her tower.

On the Prescott Forest Miss Edith Dandrea discovered a fire near the head of Turkey Creek. She reported the fire to her father and brothers, secured the services of another man, and went with the party to the fire, taking a hand in the fight. The fire had secured a considerable start when the party arrived, and when a brisk wind came up about the middle of the afternoon it was seen that they could not control the fire. Miss Dandrea then caught up her horse and rode 15 miles in record time over rough mountain trails and roads to the nearest telephone in Crook's Canyon and notified the Forest Ranger of the district. Later the fire was put under control. The Forest Supervisor reported that the prompt action and work of this woman prevented a large fire and saved a big area of young and mature yellow pine, which the fire would shortly have destroyed.

ADDITION TO EASTERN NATIONAL FORESTS

The purchase of 42,221 acres of land in 101 different tracts in the White Mountains, Southern Appalachians and Arkansas, at an average price of $4 an acre, was authorized by the National Forest Reservation Commission on June 15. The tracts are located in Alabama, Arkansas, Georgia, New Hampshire, North Carolina, Tennessee, Virginia and West Virginia.

The commission also authorized the examination of lands in Kentucky with a view to determining their suitability for the establishment of a National Forest in that State. Investigation will be made of lands outside the Appalachians with the object of ascertaining the protection afforded the flow of navigable streams by forest cover.

NO SMOKING ALLOWED ON BLOWDOWN AREA

Smoking, during periods of fire danger, on National Forest lands within the cyclone-swept area of the Olympic Peninsula, Washington, was prohibited on and after July 1, by Secretary of Agriculture Wallace. Exception to the smoking rule is made on improved camping grounds designated by the Supervisor of the Olympic National Forest, and improved places of human habitation.

The area covered by the "no smoking" order amounts to some 540,000 acres, and includes all of the Olympic National Forest west of a line extending from the east end of Lake Crescent, southward a distance of approximately 45 miles to the east end of Lake Quinault. The period of fire danger during which no smoking will be permitted is to be determined and publicly announced by the District Forester at Portland, Oregon.

The fire trap created by the cyclone of January 29, which swept the forests of the Olympic Peninsula in a wind estimated to have reached 150 miles an hour, is the worst known in the history of the country. Over 6¼ billion feet of timber, on a strip 90 miles long and from 20 to 30 miles wide, was blown down by the storm and now lies in a tangled mass. The greatest damage was done on State and private lands; only about one billion feet of National Forest timber being windthrown. Should fire ever gain headway in this devastated area foresters say that the most stupendous conflagration in the annals of the Nation would result.

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BIRDS ASSIST IN WAR ON INSECT PESTS

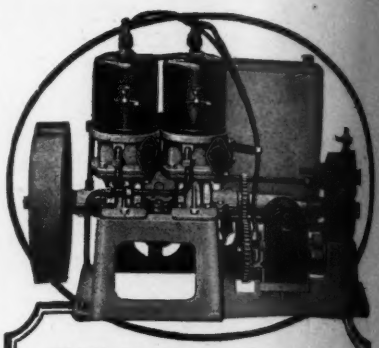
SPECIAL investigations to find out how far the various bird species aid mankind in his perpetual war on insect enemies are being carried on by the Bureau of Biological Survey, United States Department of Agriculture. In the western States the grasshopper is particularly troublesome, so far as the farmer and the ranch owner are concerned. Specialists found that of 27 species of birds examined 25 were grasshopper eaters. In 19 of the species all of the individuals collected had given grasshoppers place on their menu. The birds having the best records were the lark sparrows, meadowlarks, Franklin gulls, Arkansas kingbird, crow blackbird, and the common kingbird.

Probably there are not enough birds in the country to clean up a full-strength invasion of grasshoppers such as the western farmers have come to dread, it is said, but the birds assist materially in the efforts made by man to control the pest.

Specialists say that poisoning campaigns are among the best weapons used against the grasshopper. From time to time reports are sent in, saying that many birds have fallen victim to the poisoned mixtures placed for the insects. Such charges were associated with the gypsy moth spraying campaign in New England and with the laying of poisoned mashes for cutworms and other insects. Careful observation, made by experts, shows that the bird losses from such causes are insignificant. Some birds, it is said, are not harmed at all by the presence of poison placed for insects or vermin; the quail in California were not harmed by the baits that were set out to kill ground squirrels—though the campaign was a general one and was conducted with much intensity. In the Dakotas a few birds succumbed to the arsenic mashes placed for grasshoppers, but the number killed was so slight as to be of no consequence, it is said.

HOW SQUIRRELS PLANT WALNUT

The fence-rail forester seems to have the needs of the black walnut in his mind when he goes about his work. As a sapling this species cannot endure much shade; if it is to survive it must be planted in rich soil, where the sunlight will fall upon it. The squirrel has set out whole groves by burying the nuts in the open areas at the forest edges, and also many single trees by planting in the fence corners. Why he buries the nuts is evident enough, but why he leaves some of them to sprout and grow is not so clear. It may be that an unusually severe winter—or a hunter or an owl or something else kills the little banker before he has time to draw out his savings. An early spring may make him independent of his storage plant.



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